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INDEX.

Animal food, diseased, 104, 125
Animal physics, 137
British Juggernaut in India, 217
Cardiff, sanitary state of, 392
Caries of the teeth, 13
Chemicals, sanitary improvements in manufacture of, 82
Cholera in lower animals, 263; excessive atmospheric pressure the cause of, 264
Climate and rheumatism, 140
Colliers, Mr. W. I. Cox on diseases of, 48
Copper-smoke and its effects, 14
Crime, legalised causes of, 139
Crimean Sanitary Commissioners' Report, 315
Disinfection and deodorisation, report on, 214
Drainage of London, Dr. Hawksley on, 28; Mr. Nicholas on, 65
Drowning, apparent, treatment of, 192
Epidemic and endemic diseases, local reports of, 84, 192, 297, 398
Ergotised rye, detection of, 83
Fæcal refuse of London, Dr. Ayres on disposal of, 17
Female Sanitary Society, proposal for, 296
Fever, treatment of by fresh air, 262
Food-grains of India, 395
Gas nuisances and their removal, 191
Graveyard statistics of Warwick and Leamington, Dr. J. Webster on, 63
Health of London during 1856, Dr. J. Webster on, 277
Huddersfield, sanitary condition of, 73, 178
Hydrophobia, Dr. Pickells' notes on, 371
Insanity statistics, 139
Life assurance, 263
Measle of the pig, 15
Medical scientific reform, 1
Medical geography and endemic diseases, 249
Medical Pilgrim's progress, Dr. B. W. Richardson on, 353
Meteorological report, 14
Meteorology, Mr. Glaisher's treatise on, 15
Meteorology and epidemics of the seventeenth century, Dr. Winn on, 55
Metropolitan hygiene in the past, 335
Mourning, summer, for females, Dr. F. J. Brown on, 286
Netley Hospital, 316
Nursery government in its sanitary aspects, Dr. H. Barker on, 164
Oesterlen's Handbook of Hygiene, 260
Pauperism in England and Wales, 83
Plague at Dunster in 1645, 10
Post Office, Dr. Lewis's report on health of officers of, 37
Questions of the day, 261
Registration of disease in England, 317
Reports on cities, towns, and districts, 73, 178, 288, 392
Russian army, medical organisation of, 104

Sanitary legislation a first duty of a Government, Mr. Daniel on, 157; notes of, 104, 213, 315, 416; and social science, 73, 178, 288, 392
Scarlet fever, treatment of, 13
Seaweeds, edible, 79
Sewerage and agriculture, 133; metropolitan and town, 136
Sick room, management of, 138
Social epidemic, the, 327
Sweating sickness in England, 105
Teignmouth, sanitary state of, 288
Torquay a resort for consumptives, 137
Turkish army, Mr. J. N. Radcliffe on hygiene of, 141, 265
Vaccination, 239
Vegetable poisons, Dr. Pickells on, 44
Ventilation, McKinnell's, 294
Water in St. George's, Hanover Square, 16; supply of London, report on, 214
Work, fresh air, and exercise, 251
Workhouses and the medical officers of health, 216
Working classes, city dwellings for, 296

THE

SANITARY REVIEW.

APRIL 1857.

MEDICAL SCIENTIFIC REFORM.*

WHILE yet the hackneyed term MEDICAL REFORM lingers on the ears of the public and of the profession, while the one party is talking of its rights, and the other of its freedom, we may perhaps be permitted to vary matters a little, by throwing out a few thoughts on the subject of the reforms which are called for in the science and practice, rather than in the politics of medicine. It sometimes happens that men, in aiming at a constitution favourable to their views of government, forget or ignore the bases on which their true power rests. Seeking for an imaginary system of government, framed out of men's devices, and having its hold on state influence and power, all classes of men are more or less led away from the simplicity of natural forces and laws, to make for themselves a sovereignty, which bears for the briefest period a firm position; which soon becomes obsolete, because it does not advance with the time stream; and which, after the lapse of a few passing years, is called old, exclusive, unadapted to the age, and unfitted for the ends it was intended to serve.

At this moment the medical mind, agitated with the fever of political systematising, looks forward with hope to days of sweet peace and quietness. All differences are to be amicably arranged, the Colleges are to give up prescriptive rights, the profession is to be equalised, gradism is to cease, and the brotherhood of doctors is to be unanimous in thought. Such is the aspiration of the ardent medico-political reformer. It is a dream; a dream made out of nothing, conjured up in forgetfulness of history, in non-appreciation of mind, of matter, of man. This new medical regime established, how long will it fulfil its purposes? Will the boys who are now learning *hic, hæc, hoc,* and who are to be emancipated from school to embark

* The Complete Scientific Library of a London Medical Student of Modern Times, selected on the recommendations of his Professors. London: Churchill. Longmans. Walton and Maberly. Renshaw. 1853-57.

in physic, will they accept it? Will the nauseous medical reform pill at once lose its notoriety? If it does, all that can be said is, that a miracle will have been accomplished; that nature will have surrendered to man; and that the consummate wisdom of young to-day will have forestalled the wisdom of old to-morrow.

Let us, however, not be looked upon as opposed to medico-political reform. On the contrary, there is no old restriction, no old rotten clumsy obstruction, which we would not uproot with the ardour of the most liberal politician; but, in rooting out old obstructions, we would be mindful not to build up new ones, lest our followers should say of us, "these men threw down, it is true, many ancient ruins, to erect a new edifice, which partakes neither of the fame of antiquity, nor of the spirit and taste of modern times."

While, therefore, we argue for the natural equalisation of the medical profession, we foresee that all legal equalisation must and can be but temporary in its results; and hence we infer that true medical reform lies, not in the constant change of medical politics, but in the steady improvement, development, and simplification of medicine as a science and as an art. The man who in his labours makes even the smallest improvement in these directions, is the one and true medical reformer; other men are but talkers about what they do not understand. William Harvey reformed medicine more thoroughly than all the medico-political orators that have ever breathed; yet Harvey was no politician, but lived through a great political crisis, taking no part in its wars, its debates, its transmutations. He simplified his science, he gave it a solidity, he gave it a splendour unparalleled; he won from Nature her secrets, he expounded these. This was his medical reform, and it was abiding; for medicine is a natural science, and as such must progress.

Further simplification, further solidification of this kind, is called for now more urgently than ever; let us briefly point out in what directions these natural reforms are required.

The first scientific reform lies in the simplification of our *nosologies*. Cullen, with his thousand and one diseases, names, and arbitrary definitions, must be cast off. The elements of diseased action are few and simple; the phenomena which accompany these elementary forms are numerous and various—nothing else. Yet, up to this time, we go on making the phenomena of diseases diseases *per se;* giving to these phenomena special names; travelling far away from the essence to the signs of it; ignoring the unities, and losing ourselves in the contemplation of their manifestations.

The student of physic, entering on his career, takes up the work of some eminent practitioner and writer, and what does he find? A nosological vocabulary, in itself taking a lifetime to remember. The result is that he fails to remember it; and it is but fortunate that his inability turns out practically of little moment. From his readings he goes to the bedside, and the mystery of the labour vanishes altogether, or else becomes more mystical. He sees soon that he cannot connect his reading with his practice. In time, he sinks his theory in his practice; he seizes naturally a few familiar symptoms, he groups these together, and on the observation of these he bases his practical measures, according to the dictation of his common sense and the power of his judgment. He says to himself, that he can be guided by no written rules, he must follow indications; he rather retracts what he has learned at school, than carries it out more fully. He meets a medical friend in consultation, and they take different views; yet they both studied perchance from the same works, or were even under the same teachers. Medicine, he now sorrowfully proclaims, is not a fixed science; and this is his only consolation. In nosology, neither generalisations nor specialities are correct. Both are indefinite. Ask this man what he means by inflammation, he will give you a definition based on local effects; ask another man the same question, and he will deal out general views, and put down local appearances or effects as coincidences or sequences; ask a third man what he means by inflammation and what by fever, and he will fall down straightway, and bring you with him: he will ask you what fever you mean, and end the debate.

About five hundred different terms are used to express various diseases. They are intended to convey something; they all indicate that doctors differ. What is worse, the desire for new nomenclature is so much on the increase, that the progressive doctor requires yearly a new dictionary, to explain new phrases.

But in what way is reform in nosology to be accomplished? This is a hard question. For old terms and phrases, like aged friends, carry with them the remembrance of earlier times, and are not to be ruthlessly disposed of because their long years have made them imbecile. Patience, patience! let them die in peace, and give them decent burial. But this also; do not let the respect for their age support their imbecillity. Let them die; and as they go out naturally, one by one, place nothing in their stead but that which is coherent and simple. Let every new term embrace and explain a dozen old ones: cut down, cut down, that is the rule.

We have said that the elements of disease are few; on the

distinction, or rather isolation, of these elements a new nosology must ultimately rest. Time *was*, when chemists did not know a simple from a compound, and did not even care for the distinction; then elementary forms came first under scrutiny; then many elements were supposed and distinguished; then these were one by one eliminated; and now the prospect is clear that the elements of nature are coming down to a mere sexto, or even trio, in the chemist's eye. Time *is*, and in disease we have not discovered a single elementary character; there is not a man in physic who, pressed hard, and driven to essentials, can, in looking at disease, even guess the difference between the essence and its symptoms; or, in other words, its concomitants. We take a group of symptoms together, and give to the group a name; we do the same as the old men, who looked at the stars, and grouped them into constellations, calling this a god in armour, and that a bear with a tail, but not dreaming that these stars were suns, the centres of great systems, the lights of other worlds.

In getting at elementary forms of disease, we shall never advance a step by mere disease watching and symptom grouping, important though this may be in its place. We must work at deeper strata. We must look at natural acts, learn these, and discern and prove that every indication of disease is but an indication that some natural or physiological function is playing its part in either an exaggerated or a reduced degree.

The actions of disease being thus traced back to a physiological basis in every case, our nosology would become of a necessity so simple, as to be included in the main in a dozen terms; and the verbal trash of Cullen and his followers might go to the end of the chapter—or, still better, out of it altogether.

Passing from nosology to *physiology*, we come to reform number two. Our physiology is progressing fast, and the progress of the present age in this department will be the wonder of the next. Physiology is the quack's curse, and the crown jewel of scientific medicine. As it unfolds itself, it opens up the mysteries of life and being. Yet physiology needs reform. It is neither solid enough, simple enough, nor expansive enough. It, too, has its vague terms, its fables, and its quibbles. It, too, is so general in many of its teachings, that practice cannot avail itself of it, nor common sense accept it. It, too, is full of details and minute distinctions, bearing on no great problems. Its student goes not for his inspirations into the great universe. That very sun, which is the centre of all physiological being and action, is thrown over to the astronomers; it is not for his contemplation. Meteorologists may amuse themselves with rain, and aerolites,

and winds, and electricities; for these are out of that student's domain. He knows microscopically the arrangement of capillary vessels, the appearance of blood discs, the striated character of the muscles; he knows a few chemical facts, and therewith he is content. When he meets the really unknown, instead of finding an acknowledgment of the unknown, he finds books filled with hideous mysticisms, which turn his brains with wonder, but which he must learn to satisfy learned examiners. He reads of the vital and the nervous forces, of the *vis insita*, of excito-motory powers, of irritability, and the like. He receives without apprehending; and when, after many years of hard labour, he sums up in candid thought the results of his efforts, he finds that, apart from a few mechanical facts about the circulation, and the arrangements between bone and muscles, a few chemical facts relating to respiration, and one complete problem regarding the laws of optics and of vision, he has attained to nothing positive whatever; but, on the contrary, is left in a perfect Babylon of doubts, silly terms, and incoherent, contradictory speculations, which bear their weakness with them, and show it off freely.

That which is required most in physiology, is a positive system. We have abundant details; sufficient, possibly, to answer the purposes of a grand scheme of reform and simplification in this science. Out of the mountains of facts and experiments which industry has raised, how much is there of positive knowledge? how much of mere dusty verbiage? If these facts were known, how rapidly would medicine be simplified!

To the simple and uninitiated mind, it would seem strange that, in the description of the parts of any machine, whether animate or inanimate, there should be any mystery or any difficulty, save that of mere observation and labour. Yet it is true that the physic art fails even here, and that, in ordinary *descriptive anatomy*, a sweeping reform is the pressing call of the day. Oh, unhappy medical student, born to go through the ordeal of anatomical learning! We feel, for ourselves, like Shadrach, Meshach, and Abednego, after passing out of the fiery furnace; for you, we feel like martyrs in general about to go into it. What a ragamuffin set of terms have to be stored up! What senseless stuff, what confusion, what very falsehood! "Iter a tertio ventriculo ad quartum ventriculum"; there is a term to get up, for an opening of the size of the hole through a needle's head! "Hippocampus major"; what an idea for a knuckle of brain mass! "Processus e cerebello ad testes"; exquisite definition! little wonder that a plucked student should have given this as the longest process in the body. "Aqueducts" of various

kinds, for conveying everything except water, and so on, so on, till the whole study is made just as disgustingly silly and difficult as the most thorough scientific red-tapist could desire.

Whose fault it is that this state of things exists, we cannot tell. Yes we can; it is nobody's fault, because it is everybody's. The explanation is historical. Anatomy has been wrought out and elaborated piecemeal, bit by bit, by different men in different ages. It has been literally thrown together; and, as a science, has never been systematised. It is fair to Erasmus Wilson, Ellis, and Quain, to say that they have, as far as they dared, softened absurdities down; and it is fair to Dr. M. S. Buchanan, of Glasgow, to state that he as a teacher has done perhaps more in this direction. But even these distinguished anatomists have been able to do but little; for it is no softening down, compromising scheme, that is demanded, but a revolution out and out. The parts of the body are simple enough in themselves, like everything else in nature, if men would but let them alone, and not add a tail to this, a triangular face to that, and a nates and testes grotesqueness to the other.

Let us have at least some uniform rule in our anatomical language. If organs and parts are to be named after the men who first described them, good. If they are to be named according to their uses in the economy, better. If they are to be named according to their resemblance to general objects, to triangles, apples, stirrups, hammers, boats, lyres, pens, and Jove only knows what else, *bad;* but better even so than as now is. Better anything in the way of change, for worse is impossible.

Moreover, the most provoking business is, that the confusion, here but imperfectly described, is utterly unnecessary. To tolerate such a Babel of nonsense is like tolerating coke smoke in a close room, because, as it has been against custom to open the window, the old stupid unused machine sticks in its frame.

Out of anatomy we plunge into a deeper mire, a slough of despond *par excellence;* little guide books into it, but not a word about escapement; the London, Edinburgh, and Dublin *Pharmacopœias.* Very curious treasuries of medical literature are these wonderful documents. With some useful instructions, they have in every age blended the worst absurdities of medicine. Philosophic Oil of Bricks was once a grand feature in these guides; the bricks are levelled, but there are still retained the most incongruous messes: chemical cookings: confections, with a dozen ingredients: plasters which nobody knows the use of: mixtures which nobody prescribes: and a plan of arrangement in all parts, which is neither strictly chemical,

therapeutical, nor pharmaceutical. Everything, indeed, is done to spin out. There is a large class of vegetable substances which owe their medicinal virtues to tannin. Simplicity would dictate that this fact might at least be stated, and that tannin simply might be made to take the place of all the medicines in which it plays the active part. But this would be contrary to routine; to go contrary to routine is to go with reform; to go with reform is to go to destruction. So say the red-tapist science men. It is at the same time satisfactory to know that the *Pharmacopœia* is a book which may at any time be reformed. It is in the hands of the Colleges. If it does not improve in scientific tone and attach itself to the age, we have therefore the privilege of seeing where the screw works. We need not say more, for we have hopes of the *Pharmacopœia;* it is a loose book, and as the Colleges prefer reformation to death, they will in all probability make the same preference in virtue of their literary offspring.

Need anybody be told that reform is demanded in the science of *therapeutics?* It requires no ghost of Munro to rise and proclaim this. It is a fact which the people understand as well as the profession. The truth must out; we have gone on for years and ages past, assigning uses to ten thousand of medicaments, on reasons and observations solely imaginary. While this has been progressing, and men have been bowing themselves to their bottle idols, all begilded, becyphered, and bemystified with Abracadabra, they have let the essentials of existence lie in forgottenness. Talk about pure air in the presence of camphor; of exercise in the face of blue pill; of dietary in the shade of the gentian tree. Oh, horrible! Sceptic, impudent, ignorant of the ignorant, shut up your shop, for your doom is written; *you are no practical man.* Or amend your ways, for that is not hard. Give to the old woman in the sick man's room the air, the fire, and the water—those are her tools. Take you yours and mind them only; the gilded bolus and the soft emulsion, the sweet-smelling rose leaf and the invincible lavender, the variegated fly and the honey of squills. Take these; and in spite of the old woman, the air, the fire, and the water, cure the patient, and write thy practical aphorisms on the use of thy remedies. That is practice; stick to it, and to Hades with your philosophy.

We have hit rather hard here, we begin to fear; yet not from want of faith in medicines, but from want of faith in the loose way in which the actions of medicines have been studied and described; and in which the results of treatment have been attributed to this and that drug, without

knowledge of the action of such drug on the economy, and without reference to the external conditions surrounding and influencing him to whom it has been administered. The man who disbelieves the value of some remedies, even though he may not understand their precise action—we mean such remedies as quinine, iron, and opium—must either be of distempered mind, or practically ignorant of the application of therapeutics. But even he, in all his vagaries and want of knowledge, is less culpable than the man who worships only the bottle idols, and explains their marvellous benefits in the language of mythology; who, stepping away from what he has really seen, and really knows, says, in the jargon of mysticism and conceit, this is a tonic acting on the nervous force, or that is a stimulant exciting the muscular force. What, Master Jargonist, is the nervous force, what the muscular? Tell us these facts only, and your speculation shall have our regard. But surely your horse should come before your cart, if you wish anybody to ride with you.

The mania for new remedies is, again, not a little mischievous to the progress of the science of medicine. We object not to the introduction of new medicines, when physiological research supplies the suggestion; nay, we would never object to an empirical remedy, if repeated experience should show its value. For it must be admitted that almost all our truly useful remedies have been supplied through accident. Thus was cinchona first made known. But the objection lies at the door of loose observers, who, having tried some new medicine some dozen times, or even less, and having observed that their patients recovered, straightway run their heads against the notion that the remedy effected the cure. In a word, we wish only to introduce natural scientific reforms. We see that while we remain arguing vaguely, and deducing theories from uncertain data, we are sapping the foundations of medicine; that we are opening the way, and keeping it open, to every absurd quackery and delusion; that, taking advantage of our uncertainties, that grossest of all humbugs, the homœopath, resting on nature for his patient's recovery, and gulling him with an inconceivable dose, is able to point to his cures, and to compare his success with ours; and that people hesitate whether or not they should take our nostrums, because they have a kind of indistinct idea that we ourselves are uncertain as to the means we are pursuing and as to their ultimate absolute efficacy.

Lastly, *pathology* does not escape from the necessity of reform. There never was a time when this branch of medical science was cultivated with such industry and perseverance.

Yet here, too, the tendency is to the introduction of details upon details. Instead of being blended and studied with the study of symptoms, with the study of physiology, with the law of causes, with the law of effects, it is made into an isolation; and men, glorifying themselves in the title of pathologist, excuse themselves from the labours of other departments of research, "as pathology is their forte". They get too frightfully stuck up on this labour, because it is fashionable, profound, and minute; and other men of wider aims are looked down upon from their side-hanging pedestals. Fall it not to us to throw slight on the industry of any man, or on the advancement of any science; but be it our task and duty ever to attack extreme exclusiveness, and that narrow conceit which fosters on it; and to proclaim the unity, not only of the sciences out of which medicine rises, but of nature altogether, the one and indivisible.

As in physiology, so in pathology, there are no great laws being developed, or, at all events, there is no determined effort being made toward the eduction of such laws. But again, in place of laws there is a super-superabundant development of new words and terms; how many per year we dare not say. One looks on with dismay, and says, where will it end? Is every new pathological name the sign of a new element in pathology? Assuredly not, but rather a grand departure from elementary facts, into broad spreading, bringing to nought hypothesis and argument.

Thus we have glanced at a few of the reforms required in the fundamental principles of medical science. It is new ground this, hard to dig into, and dangerous to interfere with. "Trespassers will be prosecuted", is the old precaution stuck all over it. But the letters look faded; and although a good many trespassers have jumped into it, to be *rigorously* prosecuted, modern times are more liberal, and the risk is less. Whatever we have said has been for the ultimate honour and security of medicine; and if, in discussing our subject independently, some hard sayings have been inflicted, the axiom, *that true medical reform can only be based on medical scientific reform*, stands out the more boldly for the freedom with which it is proclaimed. While some may laugh, and some condemn, and some wince, at our plain-spoken arguments, there are, as we know, amongst those who understand medicine and her position in current history best, those who will sympathise with us most; for there are no men who detect the imperfections of medicine so keenly as those who know it scientifically, and who grasp its great truths in the firmest embrace.

THE PLAGUE AT DUNSTER IN THE YEAR 1645: REMARKABLE SANITARY REGULATION ADOPTED BY THE INHABITANTS DURING ITS PREVALENCE.*

As Dunster is the town mentioned by Sydenham, in his account of the Plague of the years 1665 and 1666, where a peculiar and somewhat successful mode of treatment of this dreadful disease was adopted, it claims a place in the history of medicine, as well as in that of the eventful period, when both intestine war and pestilence distracted the minds of the sovereign and his subjects.

In a ramble during August, 1855, through the beautiful district, where the Quantock and the Brendon Hills lie side by side, sheltering the picturesque villages which nestle in their valleys, and give life to the alluvial plain bordered by Minehead, Dunster, and Blue Anchor, we were induced to make some inquiries upon a subject of so much interest to the medical profession. We accordingly visited the priory church of Dunster, where we were allowed to make a thorough search of the parish register, an authority that lent us some aid, but which, we regret to say, in these days when Archæological Societies are so flourishing, had been sadly neglected. As our visit took place immediately after the Somersetshire Society had held its congress at Dunster, we naturally expected to find this, the most ancient and important document in the parish, dusted and put into its proper place. Our anticipations were not realised; it was a long time before we could find the register wanted, and when it was found, we discovered that the devastations of time, the worm, civil war, and neglect, had rendered this public record almost useless. These defects in the said register are mentioned only because they considerably interfered with our investigation.

We will first direct attention to the passage in Sydenham, where he devotes considerable space to the discussion of the merits of blood-letting in the treatment of the plague. After quoting many authors, who held that bleeding in pestilential fever was the proper remedy, and deprecating the abstraction of small quantities of blood, which he, with Leonardus Botallus, considers highly injudicious, whilst a full depletion has the

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* The Works of Thomas SYDENHAM, M.D. Translated by R. G. LATHAM, M.D., for the Sydenham Society. 1848. p. 110 et seq.
CLARENDON'S History of the Rebellion, vol. ii, p. 368.
The Parish Register of Dunster for the year 1645.
SAVAGE'S History of the Hundred of Carhampton. pp. 412.
Proceedings of the Somersetshire Archæological and Natural History Society during 1855.

contrary effect, Sydenham thus writes: "I will relate a fact that occurred in our own island a few years ago (1645); it is one of great rarity, and not foreign to the subject. . . . Amongst the other calamities of the civil war, which afflicted our unhappy country, the plague made in many places its ravages. Amongst others, it attacked Dunster, in the county of Somerset. It had been introduced from without; some of the common soldiers it killed at once; plague spots having suddenly broken out. Others also it attacked. There was a certain surgeon, who had returned from a long travel in foreign parts. He was serving as a common soldier; he earnestly entreated the governor to let him do his best for the relief of his fellow soldiers, who were seized with this terrible disease. The governor gave him leave. He bled the patients straight off, the moment the disease seized them, and before any tumour appeared. He took an enormous quantity of blood, keeping on until they were unable to stand on their feet; they stood whilst they were bled: it was done in the open air. There was no vessel to catch or measure the blood; the soil served for basin. He sent them after this to lie down in their tents; he used no remedy beyond bleeding. He treated a great number in this manner; strange to say, not one died. I had this from a man of equal probity and truth; Mr. Francis Wyndham, captain in the army, being my informant."

This passage shews that the plague was at Dunster, and that it was brought there from without. The port of Minehead, where this disease in 1645 slew five times the usual number of the inhabitants, was the inlet through which it travelled to Dunster, where it evidently was not suspected to exist, for Lord Digby signified his Majesty's (Charles I.) wish that the Prince should leave Bristol, where the plague was very fatal, and at once proceed to Dunster, both to be out of the way of the epidemic, and to encourage the new levies, little thinking that "the disease was as hot at Dunster town, just under the castle." Savage writes, "there were several entries of the burials of soldiers from the castle." (1645.) To corroborate this statement, we searched the defoliated register of the parish. From this record, which unfortunately became imperfect at the end of June, 1645, and contained on the same page, where the burials for that year were written, some which took place several years later, we discovered that *four* soldiers only were buried in the first half year of 1645, two in February, one in March, and another in April. These must be "the several entries" alluded to by Savage. In the preceding two years the number of deaths recorded was, in 1643, 27, and in 1644, 42; whilst in the first half of the pestilential year, 1645,

58 were buried. In May alone 23 died, which nearly equals the full amount of the whole of 1643. The plague seems to have made a sudden leap in May, the registrations for each month being—in January, 8 ; February, 5 ; March, 2 ; April, 7 ; May, 23 ; June, 13 : in all—males, 30 ; females, 28 ; total, 58.

It can easily be imagined that the plague found an appropriate nidus in this little village, when we consider that even up to a late date there were open ditches running down through the main streets, into which filth of all kinds was thrown. On each side of these streets were high causeways for foot passengers, which so narrowed them as to admit of but one vehicle passing at a time. There were also two large dungheaps—one in the middle of the town, and the other just above the principal inn. What is now an open street, just below the market cross, was filled up by the market place and town hall, making the streets on each side both close and narrow.

It was in the long street, called West Street, over-shadowed by wooded hills and the towers of the castle, that the plague was most virulent ; and it was this street where the peculiar sanitary regulation was carried out which so much interested us. It appears that the people, panic-struck by the falling of the victims of the plague around them, and convinced that the epidemic was in the air, made an attempt to shut the enemy out, as they fancied. This they did by entering into an arrangement one with another to make all their houses communicate, so as to avoid the necessity of going into the street for the various necessaries of life. Doors were made between the different tradesmen's houses, so that in the longest street one could walk from one end to the other without going into the street. Some of these doors still remain, and tell their interesting tale. One we remarked especially perfect, in Mr. Nation's house, which was formerly in the possession of the father of Mr. Withycombe, who obligingly afforded us all the information in his power.

We have calculated that the average mortality in Dunster is 24 in the year, which statistic we have arrived at by taking the number of deaths which occurred in eighteen different years taken promiscuously from the year 1575 to the year 1805.

The greatest number recorded was in the years 1645 and 1697, in which last there were registered 86 burials without any cause assigned for this excess in mortality. Had the number in the second half of 1645 equalled that of the first, that for the whole year would have been nearly five times greater than the average: a curious coincidence, when we remember that Minehead suffered in the same ratio in the same year.

A. Haviland

THE EPITOME OF SANITARY LITERATURE.

TREATMENT OF SCARLET FEVER.*

MR. BROWN opens his treatise with a chapter on the mortality of scarlet fever. He shows from the writings of Drs. Copland, Gregory, and Richardson, that this epidemic stands, next to typhus, highest in the mortality scale. In the second chapter he dwells on the origin, recurrence, and the contagious character of the disease, and on the influence of age, sex, and season on its development. Passing then to the varieties of scarlet fever, and its sequelæ, he comes to the indications of treatment, as deduced from the pathology, and proposes the use of his favorite remedy, acetic acid. The form in which this remedy is administered is as follows: dilute acetic acid, two drachms; syrup, four drachms; water, two ounces; of which a fourth part is taken every three hours. The patient's room he recommends to be kept at an equable temperature, well ventilated, and not over-heated, as is often the case; he advises that the patient be not smothered in blankets, from the idea that great warmth is needed, although he would avoid all currents of air which may chill the surface and stop the eruption; as the disease, he tells us, is rarely got over when its course is arrested at this stage. Sponging the skin with tepid vinegar and water is another suggestion made by our author, who finds it to administer great comfort to the patient, by allaying the irritation of the skin, which is often most distressing, and producing an agreeable feeling of general warmth over the surface, which induces sleep where no anodyne has the slightest effect. In summing up, Mr. Brown says that the leading principle of his treatment is based on the idea that scarlet fever is a disease of debility, and that depressing measures are all injurious. His book will be read with interest and advantage.

CARIES OF THE TEETH.†

Mr. Mackenzie argues that caries of the teeth has a common origin which is always *external, i.e.*, that it commences *on*, not *in*, the teeth. If a carious tooth be freed by the file from its decayed part, and be kept constantly cleansed, he depends on the cavity being refilled by deposit taking place naturally, in a manner analogous to the porcelain deposit on scraped bone. Speaking of the cure of toothache, the author hazards the

* On Scarlatina, its Nature and Treatment. By I. BAKER BROWN, F.R.C.S. Second Edition. Churchill. 1857.

† On Caries of the Teeth, and the Cure of Toothache without Extraction; with explanatory engravings. By DONALDSON MACKENZIE, Surgeon-Dentist. Churchill. 1855.

assertion, "that the guillotine is as legitimate an instrument for the cure of headache, as the forceps for the relief of toothache." Nevertheless, Mr. Mackenzie finds cases where the forceps cannot be dispensed with. Looking on toothache as inflammation of the dental pulp, he treats it by general measures, and the local and frequent application of anodynes. For cleansing the teeth, he recommends washes rather than powders.

COPPER SMOKE AND ITS EFFECTS.*

Although Dr. Williams's Report has been before the public two years, it has received far less attention than it deserves. It is a work written in clear and forcible language, philosophical without restraint, and scientific without complexity. It is full of strange facts and varied history. We have not space for detail; let us, however, record an opinion: "The *direct* chemical and pathological effects of the copper smoke upon the human body must be carefully separated from those *indirect* consequences, which flow from its destructive and corrosive operation upon the surface vegetation of land. In this way, beyond doubt, unless the entire tendency of modern science be utterly false, a thousand causes of disease are rendered inoperative. If it were possible to maintain a *permanent* infusion of copper smoke in the atmosphere of a given locality, the author records his deliberate belief that the population of such locality would be *permanently* exempt from those epidemic diseases, whose causative germs, whatever they may be in essence, travel and multiply from place to place in the atmosphere." If the author should ever *establish* this fact, he will have thrown a marvellous light on the causes and prevention of epidemics.

METEOROLOGICAL REPORT.†

This report contains, amongst other valuable information, a paper on "The weather in connexion with the wheat crop," by F. W. Doggett, Esq.; a report on the relative value of Schönbein and Moffat's Ozonometers, by Dr. H. Barker; and an admirable paper, by Dr. Moffat himself, "On the physical character of the urine, in relation to disease and atmospheric conditions." Dr. Moffat believes "that the physical characters of the urine are as variable as the wind." He concludes by remarking

* Report on the Copper Smoke, and the Industrial Diseases of Coppermen. By THOMAS WILLIAMS, M.D. Swansea: Herbert Jones. 1854.

† Report of the Council of the British Meteorological Society. Read at the Annual Meeting, May 27th, 1856.

"That there is a greater quantity of solids excreted by the kidneys during decreasing readings of the barometer and thermometer, than when the readings are increasing; that the quantity is greater during ozone than no-ozone periods; and with directions of the wind from south than from north points of the compass; and that it is greater during calms than when there are atmospheric currents. It also appears that the quantity of solids is greater with dry than with moist air, which may be owing to the cutaneous exosmose being increased by the moisture in the atmosphere. We observe, then, that warmth and moisture of the air diminish the quantity of solids in the urine; and it is worthy of remark, that Mr. Copland Hutchinson attributed the rarity of calculus among sailors to their sleeping between the lower decks, where the *temperature* and *moisture* of the air increased to that degree, that the place became a vapour bath. The smaller quantity of liquids and solids in the period of the day between 11 A.M. and 5 P.M. may be attributed to the free action of the skin while the body was exposed to the open air. It also appears that the quantity of solids is greater at the commencement of periods of decreasing readings than at the period of increasing readings; and it is with the former class of readings that the maximum of diseases takes place."

METEOROLOGY.*

Our meteorologists will be glad to know that Mr. Glaisher has brought out, in Hughes's series, a short but excellent, and, what is more, cheap, treatise on their science. He describes the use of the barometer, the vernier, the thermometer, and the hygrometer. He supplies chapters on vapour, rain, snow, and ozone; illustrates his pages with nicely executed drawings of clouds, and snow crystals; and finishes with an useful series of tables. The book is so easily and scientifically written, that child and man may learn from it with equal pleasure and profit.

THE MEASLE OF THE PIG.†

Dr. Fleming's labours were requested by the Committee of the Provision Merchants of Cork. Some of the questions submitted by the Committee we subjoin, with the answers in brief.

"What is the nature and origin of measle in the pig? The measle is an animal parasite, the cysticercus cellulosæ, or bladder flesh-worm.—Are all pigs measly? All pork is not measly.—Is there any analogy between measles in the pig, and the disease known by that name in man? None.—Is fresh measly pork wholesome? Is cured measly pork wholesome? We cannot

* Meteorology. By JAMES GLAISHER, F.R.S., F.R.A.S. Excerpt paper from Hughes's Reading Lesson Books. London: Longmans. 1857.

† On the Measle of the Pig, and on the Wholesomeness as Food for Man of Measly Pork. By ALEXANDER FLEMING, M.D. Dublin: McGlashan and Gill. 1857.

regard bad measly pork, fresh or cured, as wholesome food for man. We believe that the life of the parasite is destroyed in the process of curing.—Can pork be measly, and that condition be invisible to the naked eye? In the specimens of measled pork, the worms were all visible to the naked eye; in none were there any traces of the eggs of the parasite, or of its development in an earlier stage."

Dr. Fleming, following the modern view on the transmission of the entozoa, believes that the measle of pigs originates in the eggs of the tape-worm which infests the bowels of the dog. These, when voided by the dog, are resolved into fine dust, and are scattered by the wind, and thus, mixing with the food of the pig, enter its body. The report is ably done.

QUALITIES OF WATERS IN ST. GEORGE'S, HANOVER SQUARE.*

Dr. Druitt represents that the best test of the quality of the organic matter dissolved in water is its power of keeping sweet if exposed to air and light in a warm place. He thinks that the existence in water of living animals and vegetables is an unfair test of the purity of the water originally, inasmuch as pure water exposed to air, light, and sunshine, would soon teem with animals and plants. In the purity of the water of the Grand Junction Company, Dr. Druitt has "the utmost confidence."

Dr. Aldis, the colleague of Dr. Druitt in his sanitary labours, has given a report on the sanitary condition of his district, to which we shall again refer. Dr. Hassall has published a new work on *The Adulteration of Foods and Medicines*, not to supersede his previous work, but to place before the people the easiest modes of detecting adulterations. This work adds to the already well earned reputation of the writer. Dr. Huxley, medical superintendent of the Kent Lunatic Asylum, has issued his annual report, from which it appears that Kent has now "900 acknowledged lunatics to provide for." Dr. Dickson, superintendent of the Manchester Royal Lunatic Asylum, favours us with a similar document. His results show the recoveries to be nearly 68 per cent. in 160 admitted. His treatment consists in nourishing the strength of the patients, instead of lowering it, and in maintaining a strict Hygienic system. Dr. W. F. Daniell has a most interesting paper on the *Copals of Western Africa*. Dr. Richardson has brought out, in an enlarged form, and with an additional chapter on treatment, his essay on the *Hygienic Treatment of Pulmonary Consumption*.

* Report on the Quality of the Waters used in the In-Ward of St. George's, Hanover Square. By R. DRUITT, M.D. 1856.

ORIGINAL COMMUNICATIONS.

ON THE DISPOSAL OF THE FÆCAL AND OTHER REFUSE OF LONDON ON RATIONAL PRINCIPLES, IN CONTRAST WITH THE SCHEMES OF SEWERAGE NOW BEFORE THE PUBLIC.

By PHILIP B. AYRES, M.D.Lond., late Lecturer on Materia Medica at the Grosvenor Place School of Medicine.

In a memorial presented nine years since to the Metropolitan Sanitary Commission, after describing what was then known of the chemical phenomena of putrefactive fermentation, I made the following observations: "If we take the solid excrement at four ounces *per diem* for each individual, it will give for the entire population of London 223 tons of fæcal matter daily, or 81,395 tons annually. The solid dry matter of fæces amounts, according to the analysis of Berzelius, to about one-fourth of the whole, which would give 56 tons of dry matter *per diem*, or 20,440 tons; or, calculating it at one-fifth, which would probably be nearer the truth, 44 tons daily, or 16,239 annually." Adding to this at least "30 tons of the dry matter of the urine, we have 46,500 tons of dry matter, capable of putrefaction on exposure to the air, to be thrown into the Thames each year; an amount approximating to one thousand tons weekly, in addition to a very large quantity of other substances derived from a variety of trades and manufactures, the putrid blood and fluids of slaughter-houses, etc. At the same time, a large quantity of paper impregnated with putrefiable matter, and the liquid refuse of kitchens, will find its way into the sewers, increasing the mass of putrescible matter to an enormous extent; and all these substances being mixed with the silt (or mud), especially the viscid matter of the fæces, will be more or less deposited on the strand of the Thames. The Thames, being a tidal river for some distance above London, is not uniform in its flow like other rivers; each return of the tide reverses the current, and will tend to wash the putrid mud backwards and forwards, instead of at once carrying it away. When at low water, many acres of putrid matter will be freely exposed to the air, and putrid emanations will rise in abundance in hot weather, when these are most dangerous. A little consideration will shew, that by carrying the whole of the night soil and other drainage into the Thames, a greater nuisance will be produced than is now caused by the imperfect cesspools, which have been stigmatised as *barbarous*."

These remarks were penned before the gigantic schemes of

sewerage, now so well known, were promulgated ; but it is evident that they apply to every part of the Thames, from London to the sea, and it is manifest that in process of time such an accumulation of fœtid mud must occur on the strand of the Thames for miles above and below the embouchure of the sewers, as to render that portion positively pestiferous to the inhabitants of its banks and the floating population of the river ; and to absolutely forbid all schemes involving the *complete* drainage of the metropolis into the Thames. On these grounds it is not so much the question how far the refluent tide will carry upwards the sewerage, as the condition of the strand of the Thames, ten, twenty, or fifty years after the entire drainage has been cast into any part of the river. In all the notices and objections to these gigantic schemes of sewerage I have never seen any allusion to this, perhaps the strongest of objections to permitting the entire fæcal matters of London being thrust into the Thames ; but I believe it impossible to deny that such must be the eventual result, should any scheme, involving discharge of all the London filth into the river, be adopted.

Another objection, to my mind of considerable force, is, that by making sewers of such enormous magnitude and length, which can never be full, and by discharging into these the whole of the fæcal matters, so many "elongated cesspools" will be constructed, in which all the conditions favourable to rapid putrefaction—movement, and intermixture with atmospheric air, for example—are present ; and such a plan will result in a tenfold greater nuisance than has hitherto existed in the old system of cesspools and drainage ; for it is undeniable that no system of trapping can render such sewers impermeable, and the mephitic gases and vapours will find their way into the surrounding atmosphere, in spite of all precautions that may be taken to prevent such an occurrence. These objections are, I apprehend, fatal to the system of sewerage at present proposed, which, if carried out, will entail an expense of millions on the metropolis, enormously increase the parochial rates, and end in disappointment and vexation.

It is a curious fact that, among a people deeming themselves eminently *practical* and priding themselves especially on this mental quality, statements of the wildest character, based only on theoretical imaginings, should have been permitted to obtain absolute sway over the public mind, and that the first step in inductive philosophy should have been entirely ignored—that of ascertaining, by careful and well directed experimental inquiry, the physical and chemical properties of the matter in question. Where, may I ask, are the results of such inquiries

to be found? Certainly not in the records of the Sanitary Commission, nor of the subsequent Boards of Health, with the single exception that some members of the original Board, and their ardent supporters, duly attended the opening and emptying of certain cesspools, and denounced them at once as "abominations," because, during the process, a considerable stench was created. Surely such crude experiments, if I may so desecrate the term, cannot be cited as instances of the exertion of philosophical acumen, or as adding one particle to our already existing stock of knowledge on the subject.

To illustrate further the total absence of scientific inquiry as to the emanations constantly arising from putrescent matter, Dr. Southwood Smith and the sanitarians most positively affirmed that the constituent of these mephitic exhalations, which produced disease, was sulphuretted hydrogen, until I demonstrated* by experiments that, in the first place, only a minute proportion of this gas is present in the most fœtid of these emanations; and in the second, that persons may positively inhabit an atmosphere charged with a far larger proportion of this gas without suffering from the diseases attributed to the action of sulphuretted hydrogen. I may further affirm, from extensive research, and without fear of contradiction, that there is probably no one subject within the range of chemical inquiry on which less is known, than the subject at present under consideration—the phenomena of putrefaction of animal and vegetable substances. It is quite true that we are acquainted with several of the chief gaseous products of putrefaction—ammonia, and carburetted, phosphuretted, and sulphuretted hydrogen, for example; but, in addition to these, there are a number of less well defined substances, on which absolutely nothing has been ascertained, and these are indubitably the most important.

It is an almost universal opinion, that fæcal matters putrefy with greater facility than other animal matters, and that cesspools in which such matters are accumulated are foci of the putrefactive fermentation; and that therefore immense quantities of mephitic gases, highly injurious to the community, are produced, and must be got rid of as soon as possible. Never was a more mischievous or a more erroneous idea promulgated. I am prepared to demonstrate experimentally, in the most absolute manner, to any scientific commission, empowered to examine the subject, that there *is no putrefactive fermentation in the mass of the matter contained in a cesspool, that the small amount of putrefactive fermentation that does occur in a cesspool is con-*

* *Lancet.*

fined to the surface of the matter, and that but a very minute quantity of sulphuretted hydrogen is generated under these circumstances. I challenge the investigation; and I am confident, from the results of repeated and careful experiment, that the startling announcement I have now made will be proved to be correct.

In the beneficent plan of creation, such conditions have been imposed on animal matter, that when deprived of life it shall be as little injurious as possible to living beings; it either forms food for other animals or plants, or, if not adapted for these purposes, it is endowed with peculiar properties which retard its decomposition, and thus admit of such great dilution of its emanations with atmospheric air as to render them practically innoxious. The human fæces, less adapted than those of other animals as food for insects, possess a peculiar property, by which putrefactive change is greatly retarded. When fresh fæces, or night soil, remain at rest, the surface in the course of a few hours becomes covered by a tough film, by which access of atmospheric air is almost wholly prevented, and putrefactive change so much retarded that scarcely any odour is emitted; and such is the case in certain places in the neighbourhood of London (Bow Common, for example), where large pools of night soil, from one to two feet in depth, and covering a large extent of surface, are exposed to the air for the manufacture of manure. When these large pools are allowed to remain quiescent, the film, of which I have spoken, forms on the surface, and far less odour is emitted than from neighbouring chemical works; but if the night soil be stirred by raking, and thus intermingled with atmospheric air, and a fresh surface exposed, a fearful odour is emitted, until, after a few hours, the film has again formed on the surface. After a while, if the matter be left undisturbed, it becomes covered with minute fungi, or mouldiness, which feed on the animal matter, altogether change its character and odour, and ultimately reduce it to imputrescible and innocuous matter, or disperse it in the form of carbonic acid and ammonia through the atmosphere.

When investigating this subject, nine years ago, I half filled a wide-mouthed glass vessel with night soil. After the first fermentation and extraction of gases, consequent on admixture with atmospheric air in the necessary manipulation, was over, the film I have described formed on the surface. No bubbles of gas could be seen, scarcely any odour was emitted, and the surface became covered with mouldiness. This vessel remained standing uncovered in my laboratory for more than a year; but

even during the heat of summer no offensive odour was perceptible in the room, and scarcely a trace of odour could be perceived on approaching the nose to the vessel; but when the mass was afterwards disturbed, putrefaction recommenced, and the offensive odour was renewed with pristine force.

Very recently a quantity of mixed fæces and urine, from a patient suffering from typhus, was placed in a common test glass, holding nearly half a pint, and closely covered by an evaporating dish. This liquid matter very soon, in like manner, became covered by a film, and the offensive odour, at first very strong, almost entirely ceased to be evolved, and not a single bubble of gas escaped from the fluid during several months that it remained standing in my laboratory. A small quantity of sulphuretted hydrogen was evolved, which darkened the lead contained in the glass. It is a curious feature in the putrefaction of purely animal substances, as urine, fibrin, albumen, etc., that scarcely any permanent gases are evolved; and these substances undergo the full putrefactive changes in closed vessels, partially filled with air, without breaking the vessel or forcing out the stopper; while vegetable matters, or a mixture of vegetable with animal matters, such as night soil, emit large quantities of uncondensable gases during the active putrefaction, which occurs in consequence of free admixture with atmospheric air. When, for example, night soil is agitated with water and air, in a half-filled bottle, and the bottle closely corked, very active putrefaction ensues, and so large a quantity of gas is evolved, that the bottle bursts or the cork is driven forcibly out, and the liquid, expanded to many times its original bulk, flows over the sides of the vessel.

The only conclusion to be drawn from what has preceded is, that putrefaction goes on with extreme slowness in cesspools, and only at the surface where the night soil is exposed to the atmosphere. If putrefactive change were active throughout the mass, the night soil would rapidly undergo changes in appearance, whereas in cesspools it retains its peculiar colour, consistence, and other qualities, for an indefinite period, the alteration being scarcely perceptible. If putrefaction, attended, as it would be, by the abundant extrication of gases, really occurred in cesspools, the bubbles of gas imprisoned in the viscid mass would cause the whole to swell to many times its original bulk, and to run over the sides of the cesspool, instead of lying as it does perfectly quiescent, and becoming so solid by subsidence at the bottom of old cesspools as to be capable of being dug out by the spade! Such is the condition of the contents of cesspools when the matter has lain at rest for a considerable

number of years, and I may be permitted to remark, that it ill accords with the statements of many professed sanitarians, who have been the leaders of public opinion on the subject. All that I desire in making these remarks is, that a thorough examination should be made of the entire question, and that so large a quantity of most valuable matter should be employed, as it ought to be, in fertilising our fields.

A mistaken notion has also prevailed as to the nature of the fœtid emanations from cesspools of fæcal matters. For a long period the odour was attributed to the extrication of sulphuretted hydrogen. This is altogether a mistake, as the quantity of sulphuretted hydrogen produced by the putrefaction is very small, and after the whole has been separated by distillation with a weak alkaline solution, the distilled liquid retains the full odour of the night soil, and is ammoniacal. But even after the ammonia has been removed by a second distillation with dilute and sulphuric acid, the odour, although somewhat weaker, still persists, and is proved to be dependent on a volatile animal matter, which yields a rose red colour with concentrated nitric acid, which is changed to lemon yellow by supersaturation with ammonia. This substance I have proved to exist in smaller proportion in fresh fæces, immediately after their evacuation; but I have not been successful in isolating it, so as to study its properties. It contains nitrogen, however; for the distilled fluid freed from ammonia, on standing in a warm place for a few days, becomes distinctly ammoniacal.

The question now arises:—To what practical results do the preceding observations tend? It was absolutely hopeless, a few months since, to turn the public mind from the idea that cesspools, where well constructed and properly inspected, are not the "abominations" they have been termed; but the events of the few preceding weeks have so altered the circumstances of the case that I have been emboldened, at the risk of much misrepresentation, and perhaps abuse, to place my observations, and the conclusions I shall presently draw from them, before the public; and I shall feel perfectly satisfied if I succeed in drawing public attention to them, and causing a thorough scientific investigation of the entire subject.

I apprehend that it is now a settled point that the solid fæcal matters must not be permitted to enter our magnificent river and pollute its waters and its shores. But the real difficulty is to know what to do with the fæcal matters of two millions and a-half of persons congregated in the metropolis, after intermixture with millions of gallons of water. It may be said, We will excavate reservoirs, in which to allow the subsidence of

the solid matter, and cast the liquid into the Thames. This would not be objectionable as regards the river; but objections of another kind are insuperable. The reservoirs must be of such enormous size as to require vast sums to be expended on their construction, because the fæcal matter, thoroughly mixed, as it would be, with the water, is somewhat slow in subsiding; and again, the entire soluble salts and other soluble matters of the soil would be carried away, leaving a substance of inferior value as a manure. The only other course, supposing it be determined to carry off the whole of the fæcal matters by sewers from London, is to carry them direct to the sea; but this plan is open to the most serious objections; viz., the enormous cost of the works, the small amount of fall to be obtained (unless by costly pumping machinery), which would allow of subsidence, the continual labour involved in cleaning the sewers, and the direct loss to the nation of what cannot be directly valued at less than three or four hundred thousand pounds, and is of incalculable indirect value in the additional crops produced by it as a manure. Here we have insuperable difficulties on all sides to the schemes for carrying off the fæcal matters on the gigantic sewerage scheme; and that scheme must be abandoned, or, after expenditure of enormous sums of money, and burdening the inhabitants of the metropolis with enormously increased rates for many years to come, entire failure will be the result. I do not hesitate to assert, and I am ready to prove by demonstration, that no necessity for any such large expenditure exists, if the erroneous notions now prevalent concerning cesspools be abandoned, and these are well constructed and placed under careful supervision. If putrefaction, as I have shewn, does not go on to any extent in properly constructed cesspools, it is clear that the injurious consequences attributed to them must be illusory, since only a very small quantity of mephitic gases can be extricated—far less than what will be extricated from the contents of sewers when all the fæcal matters are poured into them. A well constructed cesspool is easily made, at no great expense. A pit should be dug, sufficiently large to receive the fæcal matters of the inhabitants of the house or houses during five or six years. The walls should be made of bricks, built in with Roman cement, and puddled externally with clay when in a gravelly or other soil. The top must be closely covered, and a pan with a six-inch pipe should pass down some distance below the escape pipe drain, and in all cases water should be laid on. It is evident that, with such a construction, percolation through the surrounding soil would be impossible, even in the new

cesspool; but after it had been once filled, the lining of viscid matter of the night soil would be a still further bar to percolation; and as the entire cesspool would be closed, except at the entrance of the drain pipe, little fresh atmospheric air could find its way into the upper part of the cesspool, and this would still further diminish putrefactive changes. The only nuisance would be, that once in five or six years the emptying of the cesspool would cause a bad odour in the house; but I apprehend that few would be hardy enough to assert that this would exercise any perceptible amount of detrimental influence on the health of the inhabitants.

No one can doubt that when cesspools are badly constructed, allowing percolation through the surrounding soil, or overflowing, or when they are not properly covered, they are great nuisances, and injurious to the health of the inhabitants of the houses to which they are attached; but the false argument has prevailed that, because they have been abused, they ought not to be used, and should be done away with as speedily as possible. The same argument would prevail against the use of beer, mutton, or wine, because some imprudent sensual persons overgorge themselves or become drunkards!

If, however, cesspools were established throughout London, on the construction I have described; and if at the same time they were placed under a strict supervision by proper officers appointed for the purpose, I am quite certain that no complaints, and no nuisance injurious to the public health, would ensue.

The next question to be discussed is, What shall we do with the liquid drainage? Shall we undertake enormous works for carrying it into the river at a distance from the metropolis, or may it be at once discharged into the river by the existing sewers, without detriment to the public health? This is a question of immense importance in an economical as well as a sanitary point of view. In answer, I would first remark that, until within the last twelve years, before the "barbarous" system was brought into force on a large scale, of turning the contents of cesspools into the common sewers, notwithstanding the constant flows of house drainage into the river, the water was comparatively pure; but, year by year, as that pernicious practice has been more extended, the river has become more and more foul, until public attention has at last been forcibly drawn to its condition, and the press has imperatively declared that the Thames must be purified.

As we no longer draw water for drinking from the Thames nearer than Kew, it is not necessary, nor indeed is it possible,

to render the water absolutely pure and limpid. But it may be rendered sufficiently pure and inoffensive for all practical purposes, by simply preventing the solid excreta from entering its stream; the liquid portion being disposed of with the greatest possible rapidity by the natural process I shall now proceed to describe.

In a series of comparative analyses, undertaken by order of the Government, in the year 1851, by Professors Graham, Miller, and Hofmann, of the water supplies of the metropolis, we find the following curious results:—The number of grains of soluble organic matter in each gallon of Thames water, taken at the following places, was: at Thames Ditton, 2·29; at Kew, 3·07; at Barnes, 2·75; at Battersea (Chelsea Company), 2·38; at Battersea (Southwark and Vauxhall Company), 1·51; and at Lambeth, 2·59. Further, the organic matter of the water taken at Kew was found to give 0·105 of a grain of nitrogen, and that of the Southwark and Vauxhall Company, taken at Battersea, only 0·031 grain, shewing a very considerable progressive diminution as we descend the river to this point, not only in the quantity of organic matter, but also in the quantity of nitrogen it contained. But if we turn to another table, on page 6 of the Report, we find that while the other waters contain only traces of nitric acid and ammonia, the former has risen to 0·236 and the latter to 0·0309 in the Southwark and Vauxhall water; for while this water contained the smallest quantity of soluble organic matter, it was substituted by nitrate of ammonia; so that in reality, so far as relates to nitrogenised organic matter, the water taken at Battersea was more pure than either of the other waters drawn from the Thames. On the other hand, the suspended organic matter increases as we descend the Thames; but, as the Report relates only to the drinking water supplied by the companies, its amount would, of course, depend on the care expended on its filtration. The results were: water taken at Thames Ditton, 0·0; at Kew, 0·01; at Barnes, 0·02; at Chelsea, 0·0; at Battersea Fields, 1·92; and at Lambeth, 1·15. The irregularity of these figures demonstrates the interference of pollution on the results; as we cannot suppose that the suspended organic matter should be smaller in quantity at Lambeth than at Battersea; or that, in the natural condition of the water, it should be totally absent at Chelsea.

Another series of analyses, made by Mr. Aikin and Dr. A. S. Taylor, yielded the following results:—The organic matter in Thames water taken at Henley-on-Thames was 3·73 grains per gallon; at Caversham, 2·7 grains; at Kew, 2·13 grains; at

Chelsea, 1·37; at the Tower, taken at high water, 8·0 grains; showing a sudden and very large increase immediately below London. (*Minutes of Evidence, Metropolis Water Bill*, 1851.)

The course of these curious and somewhat startling results, obtained incidentally, in the course of an investigation undertaken for an entirely different purpose, and therefore more worthy of credit, is the decomposing action of aerated water on organic matter, whereby the organic matter is rapidly reduced to the ultimate products of its decomposition, carbonic acid, nitric acid, and ammonia. From the foregoing data, it will be seen that the quantity of soluble organic matter in the water taken near the Red House, Battersea Fields (Southwark and Vauxhall Company), was really only half the amount contained in the Kew water, and considerably less than that in the water at Thames Ditton; and that even the water taken at Lambeth contained less than that at Kew, and very little more than the water from Thames Ditton. How are these very curious results to be explained, except on the well known facts that organic matters, in contact and agitated with aerated water, are rapidly oxidised, and reduced to inorganic matter? The large proportion of nitric acid, compared with that of ammonia, in the Southwark and Vauxhall Company's water, taken in Battersea Fields, is interesting, because, had the proportions been reversed, the presence of ammonia might have been attributed to the numerous gas factories, whose gas-water, containing large quantities of hydrosulphate of ammonia, is discharged into the Thames; and it is possible that some part of the ammonia might be derived from that source.

However this may be, it is quite clear that, notwithstanding the constant drain of organic matter into the Thames at London, and the thorough intermixture of these matters with the water by the flow and ebb of the tide, the quantity of soluble nitrogenised matter is less near London than at Kew, and little more than at Thames Ditton. But, on the other hand, the quantity of suspended organic matter is much greater near London than higher up the stream, as we may readily convince ourselves by merely looking at the water. The soluble organic matter rapidly undergoes change; but the insoluble matter is much more slowly destroyed, because it is necessary that it should undergo a series of changes, before it can be brought into solution, and rendered amenable to the action of the aerated water. More than this, it is liable to be deposited with the mud on the strand of the Thames, and thus protected from the decomposing action of the air and water.

These views, so far as the destruction of organic matter is

concerned, are supported by the evidence of Dr. A. S. Taylor and Dr. Clark, given before the committee on the Metropolitan Water Bill (*Minutes of Evidence*, p. 687). Dr. Taylor says, for instance, in answer to a question relative to the influence of the sewerage on the water: "All such substances are very rapidly decomposed and destroyed; the nitrogen is converted into nitric acid (and ammonia?); the sulphur is converted into sulphuric acid; so that those fœtid substances which go into the Thames from London, when rolled about by the action of the water containing an enormous amount of air, are all oxidised and destroyed. Within a certain limit they may be found; but still, after a very short passage, they are very soon, indeed, destroyed." And again, "with water not exposed to the air, and not containing air, it is most offensive and unwholesome; but with the fluid sewerage mixed with a comparatively small portion of water containing air, like the Thames, and exposing an enormous surface to the air in its daily motion, the effect is to obliterate every trace that a chemist can detect." Dr. Taylor further estimates that "by the time that the water has passed six or eight miles, according to wind or other circumstances, you may have a complete decomposition of it," *i.e.*, the offensive matter. There can be no doubt then that the Thames possesses, up to a certain point, the power of self-purification; but it must be remembered that, until within the last few years only insoluble matter found its way into the river. More recently, the plan of emptying cesspools into the drains having been carried on very extensively, the Thames has necessarily become more foul and offensive; and if this system be continued and extended, the purifying power will be overbalanced, and any part of the Thames into which the whole fæcal and other refuse matters may be discharged will become positively pestiferous.

In the foregoing observations, I have endeavoured, and I believe successfully, to prove two chief propositions:—

1. That cesspools, properly constructed, with pans and discharge pipe, are not injurious, because little if any putrefactive fermentation goes on in them, compared with that which must occur in sewers, into which fæcal matters are discharged.
2. That the liquid and soluble organic matters of sewer water are rapidly destroyed by the oxidising agency of the aerated water of the Thames, and may be discharged at once into the river, without danger to the public health.
3. That, consequently, by reverting to a proper system of cesspools, under supervision by officers appointed for the purpose, and continuing the present system of drainage, large

sums of public money will be saved, the sewers will not be converted into "elongated cesspools;" the river will be practically pure for all purposes except drinking water; enormous public burdens in the shape of rates for useless, perhaps injurious, works will be avoided; and last, but not least, the material for increasing the fertility of the land will be preserved.

In conclusion, I may remark that the ultimate disposal of the contents of the cesspools may be so managed, by proper arrangements, as to be comparatively inoffensive, and at the same time innocuous, so far as regards the public health.

Wandsworth Road, Aug. 11th, 1856.

A PROPOSAL FOR THE DRAINAGE OF LONDON.

By THOMAS HAWKSLEY, M.D., L.R.C.P., Physician to the Margaret Street Dispensary for Consumption.

THE subjoined proposal to drain London by the existing system of continuous tubes or sewers, together with the addition of a detailed system of filtering, deodorising, and chemically fixing receptacles, was sent in to the new Commissioners by the author.

It is impossible to exaggerate the importance of the subject commonly called the 'London Drainage,' by which term is understood not only the removal of the surface and waste water, and of the strictly fluid refuse of the town, but also of a vast amount of its solid refuse—a refuse which, left to the present most imperfect system of removal, is found steaming up from the floors of thousands of its habitations, and from the gulley-holes of its streets; being in this way not simply revolting to the senses, but most injurious to the health. This is, however, but the beginning of evils; by the indomitable industry and perseverance of Dr. Snow, the Registrar-General, Dr. Farr, and others, evidence, amounting in strength almost to a demonstration, has been afforded, that from this source our springs and the river water can be, and are, made vehicles for conveyance of cholera poison. It is extremely probable that many other specific diseases will be found to be conveyed in the same way. Where, however, it is not the *direct* and *immediate cause* of disease, there can be no doubt that it is at all times injurious to health; and seeing how constantly the development and the force of cholera and fevers are found associated with the existence of the disgusting odours of ill-

drained habitations, it is a fair inference that they, the poisoned air or water, supply the required *tertium quid* without which the seed of the disease would have been unfruitful.

Of the fact that water is frequently the vehicle of disease, a striking instance occurred to the late Rev. Dr. Gilly, who, desiring, on his preferment to an elevated post in the Church, to leave behind him some token of his affection for the poor of the flock he was about to bid adieu to, took first to his counsel the medical man of the parish, who advised him neither to leave a store of port wine, nor of porter, to resuscitate the poor convalescents from ague; for the latter disease was endemic to the place, and was its constant scourge; but to build for them a deep well to supply them with pure water. Little did the good man dream of the benefits he was to be the happy means of conferring. The well was built; the water was used in preference to the shallower springs and surface water, and from that time *ague ceased in that district.* The Bishop referred to the fact in his annual charge delivered at that time.

It is natural that medical men, to whom these considerations must be matter of every day observation and thought, should enter earnestly into their study; they would be traitors to their calling and to their trust, did they not point out any adversary to the public health coming within their knowledge, and use their best abilities to promote its extermination. This must be my excuse for presenting my views on a question which may be thought to fall more correctly to the province of the engineer than of the physician.

Before describing the plan proposed to remedy the evils complained of, I beg to point out as briefly as possible some of the objections that I hold to other schemes which have been published:—

1. All these plans propose to convey both solid and fluid matters in a system of continuous tubes. I submit that such a practice is unphilosophical, opposed to the analogy of nature, and contrary to common sense; for the frequently recurring obstructions and leakages found actually to occur, might be easily predicted anterior to experience. It is difficult to conceive a justification for the adoption of such a system, except the despair of finding an alternative, after careful inquiry and experiment to discover one.

2. The adoption of a system of continuous tubes for the removal of both fluid and solid excretions, leaves the risk of atmospheric and spring water poisoning just where it now is.

3. The plans, which propose simply to extend and continue the present system of drainage, and to make the outfall of the

sewerage into the Thames some miles below the metropolis, are not only open to the two great objections before mentioned, but also to that of throwing away and wasting a property in all probability valuable enough at least to pay all the expenses incurred in maintaining the town in a state of sanitary sweetness and purity, to say nothing of any ill effects that might result from the discharge of so much animal matter into the river, even at that distance. I submit that the adoption of such a plan would be the confession of great weakness, and of inability to wield the powers of mechanism and of chemistry.

4. The ingenious plans advocated by Dr. Marshall Hall and by Dr. Copland are open to the first two objections, and to those arising from the fact that the unstable chemical elements of sewerage matter are subject to rapid change and loss; and that, by the time the sewerage reached the cloacæ or the reservoirs, it would already have experienced much deterioration; then would come the difficulties of getting it into a manageable form for transmission into the country; and last, though not least, the nuisances, and the possible evils, of dealing with such large accumulations within the town.

The plan I venture to propose is one, the analogy of which I find in nature. Every animal body exhibits a sewerage work tenfold more elaborate and successful than the engineer can hope to accomplish; but nature is never found attempting to convey mixed solids and fluids in a network of continuous tubes. The only instances to the contrary are those of disease and danger, such as cases of renal and biliary calculi, detached particles of fibrin in the bloodvessels, etc. For the conveyance of the fluid excretions, a system of continuous tubes, analogous to our existing sewers, is employed, and for the sake of distinction the principle concerned in their use will be called that of 'continuity;' but, for the removal of the more solid excretions, a vast number of minute excreting receptacles, which are involutions, more or less simple, of the body's surfaces, are employed. From these the contents can be easily and conveniently cast forth, and the disorder of individual receptacles interferes not with the action of the general body. The principle concerned here is distinguished as that of 'detail.'

I propose to apply these principles to the requirements of the London sewerage, thus: By 'detail,' I would oblige every house, or in some cases blocks of houses, to be provided with a receptacle, into which the waterclosets of the house would empty themselves. The fluid and solid matters, thus received, would in the receptacle be separated into a comparatively pure water, which would filter through it, and

into a solid matter which would be stored within it, and be at the same time deodorised and disinfected, and fitted for removal, in the same way as the dust of the house, at appropriate intervals and times.

By 'continuity,' the existing sewers and drains would be employed for the conveyance of the surface and waste water, together with the water filtered through the receptacles already mentioned.

The only proposal at all like the one herein sketched, is one with which I have been made acquainted since writing a letter to Sir Benjamin Hall on the subject, which appeared in the *Times* of the 3rd February. That plan is entitled "An intercepting system of sewerage, by Charles Penfold, Esq." The principal differences between the two plans consist in the absence of the filtering apparatus in Mr. Penfold's plan, in the non-employment of disinfectant and deodorising substances, in the manure being conveyed away in a fluid or semi-fluid form, also in the much greater expense and complication of his (Mr. Penfold's) plan.

The receptacle would vary in size from 1½ to 3 feet cubic capacity. It might be built of sheet iron, or of brick cemented within, so as to be waterproof, or glazed tiles might be used in its construction. At its summit, or near thereto, the house drain, conveying the solid and fluid excretions from the waterclosets, together with the necessary amount of water to flush them, would enter. From the other side, near the bottom, the exit drain would connect it with the main sewer. A filtering screen of gravel would be placed in front of the opening of the latter. (Fig. 1, c.)

The filtering screen would be constructed of two large perforated slabs or tiles of fireclay, capable of sliding down and fitting in chases, left in the cement lining the receptacle. They would be arranged somewhat obliquely, as seen in the diagram, and be separated about ten inches below, at the floor of the receptacle, and about four inches above. A little coarse canvas applied to the inner side of the tiles would prevent the gravel falling through the perforations, and the interspace between the two perforated slabs, could be thoroughly packed with gravel.

The top of the receptacle would be covered in air tight by an oak or iron flap cover.

The above described apparatus constitutes the essential machinery of my plan. Its perfection would consist in erecting, in new houses, the waterclosets outside the house, in connexion with balconies and verandahs, in the greenhouse style, combining

by this arrangement, convenience, salubrity, and the opportunity of communicating by a short, straight, cast iron tube, directly with the receptacle.

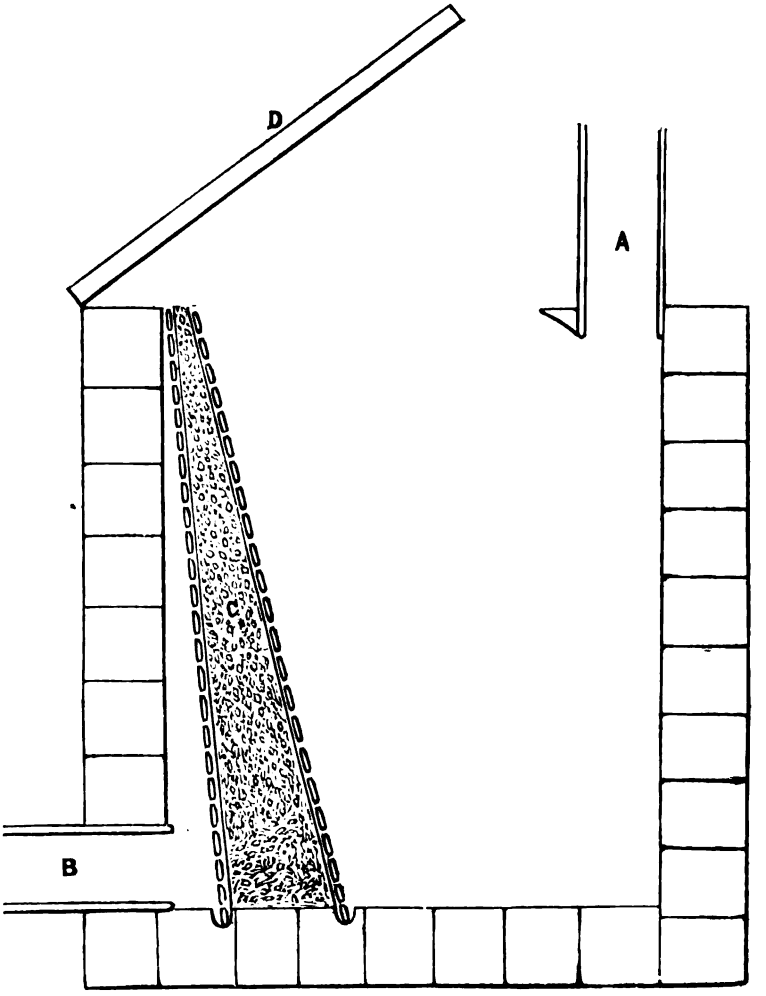

Fig. 1.

Diagrammatic section of a 'receptacle', shewing: A. The entrance pipe or house drain. B. The exit pipe to sewer. C. The filtering screen, consisting of two large slabs or tiles of fire-clay, freely perforated, and packed in their interspaces with gravel. D. The lid or cover of receptacle.

To separate the solids of the urine, and to fix the ammonia and other gases evolved from the excretions, it is believed that

caustic lime, sulphate of lime, and charcoal or soot, will prove very efficient chemicals. I propose the employment of small quantities of these, or some of these, together with cinder-dust. Portions of these it is necessary to throw into the receptacle from time to time. Deodorisation, and, there is every reason to believe, disinfection, are accomplished by the same agencies, and at the same time, as the chemical changes last referred to are produced.

EXPERIMENTS. The time which has elapsed since I took up this subject, to that in which I was compelled to send in my plan, would not permit me to appeal much to the test of experiment. I have done my best, and can only regret the meagreness of my report in this respect. A receptacle on this principle has been erected by a gentleman at a model lodging house in Chelsea; but it is scarcely completed, and there has been no time to test it.

I have experimented with a large glass receiver, fitted with a filtering screen of gravel placed between two layers of perforated zinc. The required conditions were carried out as strictly as possible, and the results quite came up to those expected.

A layer of cinder-dust was first laid down; then some soot; then a mass of human fæces; and lastly a quantity of urine, mixed with lime-water, was thrown in. The water which filtered through, though coloured by the soot, had very little odour, and that was of ammonia and soot only; and it had a much lower specific gravity than that of the mixed fluid thrown in (urine and lime-water).

In another instance, when charcoal was used as the deodoriser instead of soot, the fluid escaping was nearly colourless.

The solid manure left in the receiver was in all cases a rich black looking solid, with a strong odour of soot and ammonia, but otherwise deodorised.

My next anxiety was to assure myself of the separation of the solids of the urine, and of the best mode of accomplishing it. The most striking results were obtained by the employment of a strong lime-water, manufactured by Mr. Bastick, of Brook Street, Hanover Square, to whose skill as a scientific chemist I am indebted for some examinations of the results of my experiments. The quantity of precipitate thrown down from urine by this reagent is astonishing. Liebig has recommended sulphate of lime for this purpose; and it is believed that, in addition to throwing down the phosphates of the urine, it will fix the ammonia set free by decomposition of the urea. These points remain for investigation. The experiments already performed have been done with caustic lime and

soot, or charcoal alone; but I believe that great improvements may be effected in this part of the subject, and I do not despair of seeing nearly all the solid matter of the urine thrown down and fixed by chemicals, so as to permit of its employment in agriculture, and the arrest of its loss in the sewers.

Mr. Bastick thus reports:—

"From a pint of fresh urine in a normal state, to which concentrated lime water had been added, nearly as long as that agent would produce any precipitate therefrom, a quantity of solid matter was obtained, which, after being thoroughly washed, to remove any adhering bodies soluble in distilled water, and then dried, at a temperature of 212°, weighed 53· grains. To ascertain by a simple means, which, although having no pretention to rigid scientific analysis, yet will indicate with tolerable precision the object in view—viz.: what portion of this precipitate consisted of organic matter derived from the urine—it was exposed to a red heat for half an hour, and again weighed. The loss by heat was found equal to 13, or 2 per cent., clearly showing that the lime water had removed from the urine at least 7 grains per pint of organic matter.

"The precipitate, after being heated to redness, consisted principally of the phosphoric acid of the urine, in combination with the lime previously existing in that fluid, and that which had been subsequently added. But, as in Dr. Hawksley's plan for removing the sewerage of the metropolis, and for employing such sewerage in agriculture, no washing of the matters precipitated or solidified by the lime would take place, consequently the figures above related would unfairly present the amount of solid matter removed. In order to learn the amount of this solid matter, the precipitate from a pint of urine was simply separated by filtration, and then dried at 212°. It now weighed 89 grains.

"I also examined a specimen of the fluid which had passed through Dr. Hawksley's filtering receptacle. I found in it a perfect *absence of the phosphates*, which had been solidified and retained in the receptacle with the solid excretions. In short, the fluid in question resembled in most of its qualities the urine which had been previously treated with lime.

"WM. BASTICK."

Reply to Objections to the New Plan Proposed.

1. It may be said that the plan involves a return to the disgusting system of cesspools.

The answer to this is, that the 'receptacle' is wholly un-

like the cesspool, both in principle and in action; it is in fact a *filter*, in which the residuum of filtration is indeed accumulated for a time, but in a form and quality quite unlike the contents of a cesspool; it is harmless to health, subject as it would be to frequent removal; it is not disgusting to the senses, and it admits of removal without inconvenience or annoyance.

2. It may be said that the inhabitants of houses would not attend to the management of the receptacles, *i.e.*, supply them with the necessary chemicals and deodorisers; and that they would not submit to anything which gave trouble.

The reply is that the 'receptacle' may be made to manage itself in the intervals of its being emptied, by attaching to it a small cistern of lime-water, mixed, if necessary, with other chemicals; and a valved drum of powdered charcoal. Both of these may, without complication, expense, or difficulty, be made to emit the required portion of their contents with every employment of a watercloset. (*Vide* fig. II.) At all events, the contractors for the manure might be made the responsible parties to attend to this feature of the plan.

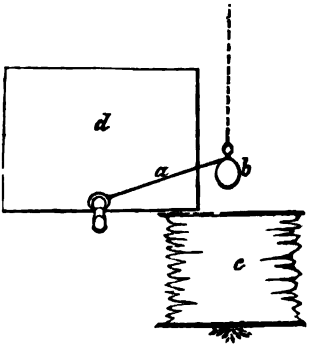

Fig. 2.
Exhibiting a diagrammatic section of a small cistern for lime-water or other chemicals, and a collapsible drum for powdered charcoal. Every time a watercloset is used, the lever (*a*) turns on the lime-water, and the weight (*b*) is raised; in its descent, the flow of lime-water is again stopped, and the weight (*b*) striking the drum (*c*), the necessary portion of charcoal is shaken out.

The objection of trouble resolves itself into a balance of advantages. On which side are the greatest, on that of the *laissez faire* system, with its filth and insecurity to life, or on that of activity, with a slight temporary inconvenience followed by the blessings of pure air, water, etc.?

3. It may be objected that every house does not present suitable accommodation for a 'receptacle.'

Almost every house possesses a front or a back area, in which the instrument could be bestowed beneath the pavement; but where no areas exist, a larger kind of receptacle might be constructed beneath the footway, which would accommodate the requirements of several adjoining houses.

4. Objections may be raised against any supposed nuisance arising from the *removal* of the manure, either from any uncorrected odour, or from the time of day at which the removal

might be effected. Also from any exaggerated notion of the expense of the cartage to be employed in it.

The reply is, that what little odour the manure might emit would be very conveniently removed by throwing over it a layer of dry cinder dust, and it might be found desirable to remove the contents of the 'receptacle' and of the 'dust bin' at the same time, and by the same organisation of carts. The addition of the manure would not impose above another third of labour on the existing arrangements for the removal of the dust. This replies also to the question of the expense and difficulty of cartage.

As to times for the removal, either after dark or early in morning would be productive of very little inconvenience to householders or to servants. The object would be effected for each house in a few minutes.

5. An objection may be raised to the expense of the plan.

I believe that this objection need not be a difficulty, for every work and substance employed by my scheme is of a common and cheap kind. Lime is abundant, and economical. Peat charcoal can be supplied in any quantity. Peat uncharred, it is said, does as well as the charcoal, and it might prove a valuable addition to the 'receptacle.' On the other hand, when in operation, the 'receptacle' becomes to the proprietor a little property, productive in direct proportion to the size of his family. It is said that at present £400,000 worth of manure are thrown into the Thames annually.

6. The difficulty of securing a general adoption of the plan may be urged as an objection.

Let the Government be assured, by well tested experiments, that the sewerage may be saved for agricultural purposes, by means safe and easy of adoption, and that consistently with it the London drainage may be much simplified and robbed of all its risks to health and life; then nothing more, it is presumed, will be needed, than to make it an offence against the law to run any sewerage or other solid or offensive matter into the drains, but such as had been previously purified and filtered by such a process as that explained. Companies and contractors would accomplish the rest.

REPORT ON THE HEALTH OF THE LONDON POSTMEN IN 1856.

By WALLER LEWIS, M.B.Cantab., Medical Officer to H.M. Post-Office.

[The following Report has, with the kind permission of his Grace the Duke of Argyll, been forwarded to us by our able collaborateur Dr. Waller Lewis. We are deeply indebted, and hope that in time a similar report on the sanitary condition of all the Government departments will be annually added to the literature of the country. Such reports are invaluable in science and in history. EDITOR.]

Medical Department, General Post Office, Feb. 1857.

SIR,—I have now the honour of presenting my second report on the health of the officers of this department.

NUMBER OF OFFICERS UNDER MEDICAL CHARGE.—By the regulations now in force the various officers may be arranged, as to their relation to the medical officer, in three classes, according to their positions and salaries.

Class A.—On those whose salaries exceed £150 a year the medical officer does not attend, except during the prevalence of an epidemic, or in cases of sudden illness or accident at the office.

Class B.—Clerks whose salaries do not exceed £150 per annum are not supplied with medicines.

Class C.—All other officers employed and paid by this department, who are attached to the chief, or Money-order Office, including inspectors, sorters, sub-sorters, letter-carriers, messengers, porters, labourers, and domestics (male and female), are prescribed for at the office, or visited at their own houses when too ill to attend. Medicines and instruments are also gratuitously supplied to them.

From various causes the number of officers in what is called "the minor establishment, or class C," is constantly varying. Some of the lately appointed letter-carriers, on presenting themselves for re-examination to the medical officer at the expiration of their six months' probation, are found to be unfit for the duties, and are, therefore, not confirmed. Some, who are disabled from attending their duties by continued illness, are temporarily replaced by substitutes; whilst interchanges between the chief and branch offices are constantly taking place. For these reasons, many more officers are under medical care, in the course of the whole year, than are entered on the books, as attached to the office at any one time.

Thus, on the 31st December, there were—

In class A - - - - - -	274
In class B - - - - - -	331
In class C - - - - - -	1,100

making 1,431 in the two last classes; while, during the course of the year, there have been 1,969 different individuals attached, for a longer or shorter period, to the two offices, any of whom, if ill, might have applied for official medical aid. As a considerable proportion of the officers constituting the difference between these two numbers have helped to swell the invalid list, classes B and C may be stated as averaging 1,500 for the entire year.

CANDIDATES EXAMINED.—During the year 401 candidates have obtained nominations as clerks, letter-carriers, etc., and, in accordance with the regulations, have presented themselves to me for medical examination. Of this number forty-seven, or nearly 12 per cent., were rejected, and 354 passed satisfactorily.

Of this latter number, sixty-one, or about 16 per cent., were subsequently rejected by the Civil Service Commissioners, making 108 rejections among 401 candidates.

GENERAL HEALTH.—The health of the whole body of officers has been highly satisfactory. It is most gratifying to me to be able to state that, among the 605 officers, in classes A and B, there is not a single death to report.

Most of the illness that has taken place in these classes has been of a slight character. I am inclined to attribute much of this satisfactory condition to the annual monthly holiday given to all these officers, which is mostly spent in the country.

TABULAR STATEMENT

Of the Number of Clerks and other Officers who presented themselves for Medical Treatment during the year 1856, *specifying some of the more common complaints.*

Months.	Clerks.	Other officers.	Total No. of officers.	Diarrh.	Rheumatism.	Sore throat.	Boils.
January	9	130	139	10	13	2	3
February	11	105	116	5	8	..	3
March	12	118	130	3	13	3	5
April.....	16	107	123	9	19	2	3
May	5	140	145	7	14	12	2
June.....	16	128	144	20	14	14	10
July	16	173	189	52	10	6	2
August.....	31	214	245	102	4	4	5
September	9	149	158	25	6	3	6
October	8	97	105	8	7	4	5
November	12	119	131	8	10	8	3
December	14	132	146	4	10	6	4
Total	159	1612	1771	258	128	64	51

About 650 visits have been paid to officers at their own houses, when too ill to attend at the office.

It will be seen by the above table that, during the year, the

large number of 1,771 distinct cases of illness have presented themselves for treatment. The total number of officers having permission to avail themselves of my care being estimated at 1,500, it follows that, on the average, each officer has suffered from illness rather more than once. By far the larger number of these cases were of little gravity, as I have always encouraged the men to present themselves for advice on the first symptoms of illness shewing themselves. In the majority of the cases thus early attended to, the disease has been nipped in the bud, and a lengthened illness, with consequent absence from duty, prevented. This, I believe to be one of the most efficient means for practically carrying out the science of preventive medicine. It is in this way that the officers themselves derive the most important advantage from the liberality of the Government in providing gratuitous medical advice, as suggested by the late Postmaster-General. Not only are they saved the cost of medical attendance, but much absence from duty, with the consequent loss of a proportion of their salaries, is by this means spared them; they are also spared the bodily and mental pain that accompanies, and the injury to the constitution which follows, a severe and prolonged attack of illness.

In the table I have specified a few of the diseases more commonly met with among the officers—namely, diarrhœa, rheumatism, inflammatory sore throat, and boils or carbunculoid disease. These are all, to a certain degree, more or less preventible. They are mostly due to impure air, or exposure to draughts, or to sudden and great changes of temperature, or to improper diet, or insufficient clothing. Other ailments, which I am occasionally called on to prescribe for, I have traced to neglect of personal cleanliness. In accordance with a report that I made on this subject in the course of the summer, the authorities have directed that more attention should, in future, be paid to this subject as regards letter carriers. It will be for the benefit of the men themselves, that the regulation alluded to shall be strictly enforced.

Epidemics.—There have been no special epidemics during the year; but the usual summer diarrhœa has been more than usually prevalent. The table shews that 154 officers suffering from that complaint presented themselves for treatment during the months of July and August alone. But these figures do not represent the actual number attacked, as many more were relieved without personal application to the medical officer.

During the summer season, sixteen of the offices in this building and the Money-order Office were kept constantly supplied with the proper remedies for this complaint, in order

that relief might be obtained at any hour of the day or night, immediately on an attack coming on.

Besides the diarrhœa medicine so supplied to the two principal offices, upwards of a hundred gallons were sent to forty branch and district offices in London and the suburbs, for the use of the officers employed there. That much benefit is obtained by this means is clear, from the following letter that has been received, with others, from the charge-taker of one of the branch offices:—

"Stepney Branch, 31 August.

"SIR,—I beg to inform you that we require a fresh supply of diarrhœa medicine at this branch. The former has proved very beneficial—it has been taken in time, and has thereby prevented more serious consequences.—I am, sir, your obedient servant,

"Wm. Bokenham, Esq. "T. REYNOLDS."

Inflammatory sore throat has been very prevalent. It is traceable, in a large proportion of cases, to draughts of cold air entering through open doors while the men are engaged in sorting and stamping in the larger offices. Many cases of rheumatism arise from the same cause—one of the most difficult evils to deal with in this large building.

There have been fifty-one cases of boils—a large number. I believe this disease to take its origin partly from improper food, and partly from living in an impure atmosphere. It is certainly contagious. I have observed it to be more frequant among the men who live in small, close rooms in the interior of the town, than those who inhabit more open dwellings in the suburbs. In my last annual report I alluded to the great advantages that would accrue to the men if they could be provided with more healthy dwellings. I should expect to see a considerable diminution in the last mentioned disease among the inmates of such improved habitations.

There have been 1,612 cases of sickness among the 1,638 persons composing the minor establishment: of these cases 716 have been severe enough to incapacitate the invalids for a time from duty.

AVERAGE DURATION OF ILLNESS.—*Minor Establishment.*—The total amount (in days) of absence from duty, on account of illness, in class C, was 11,934 days. This will give a mean average duration of 16.66 days for each officer who absented himself. But this amount of absence is unduly swollen by the prolonged absence of four officers, three of whom have not been on duty any part of the year. As none of these will return to the department, and their places have been long filled up by fresh appointments, their absence should be deducted from the

gross amount: when this is done, the average duration of each case of illness will be reduced to 15.13 days.

But a large proportion of this reduced amount of absence is caused by comparatively a very few cases. Seven officers have been absent many months consecutively; one for eleven, one for nine, and another for eight months. These seven cases have consumed between them 1,196 days, so that if allowance be made for these cases of prolonged illness, each of which was above three months duration, the average absence from duty of the remaining cases amounts to 13.59 days. This number represents correctly the average duration of each case of illness sufficiently severe to necessitate absence from duty; but if the total amount of absence be divided among all the cases of sickness, it will give an average of 6.69 days absence for each patient.

Clerks.—One hundred and fifty-nine clerks have presented themselves for treatment during the year. This number includes a few in class A, who suffered from the prevailing diarrhœa. The total number of heads of departments, clerks, etc., comprehended in classes A and B, who have been off duty, is 254, and the total amount of such absences is 4,939 days—making an average of 19.44 days each.

If fifteen of these cases, however, which have each exceeded three months in duration and have engrossed 2,409 of the whole number of days, be deducted from the gross amount, the mean average duration of each case will be reduced to 10.6 days.

Of the 2,243 officers who have been attached to the Chief and Money-order Offices during some portion of the year, 970 have been at some time absent from duty on account of illness.

The average number of days that any officer was off duty from illness, including in the calculation the whole body of officers, was 7.52 days; but if correction be made of the four exceptional cases first alluded to, the average absence will be exactly seven days;

Deaths in the Class of Letter-Carriers, etc.

Disease.	Age at death.				
	Under 30.	Under 40.	Under 50.	Under 60.	Total.
Consumption	2	1	4	1	8
Heart-disease	..	1	..	..	1
Inflammation of lungs	1	..	..	..	1
Dropsy	..	1	..	..	1
Total	3	3	4	1	11

making the mortality 7.4 per 1,000—70 per cent. of which was caused by consumption.

DEATHS IN THE CLASS OF CLERKS, HEADS OF DEPARTMENTS, ETC.—None.

This favourable statement of the mortality of the whole body of officers is, I believe, partly due to the mildness of the present winter, so far as it has yet gone.

REMOVABLE CAUSES OF DISEASE.—In the previous part of this report, allusion has been made to various complaints to which some of the officers, more particularly the sorters, are unduly subject. Attacks of sore throat, coughs, colds, and rheumatism are frequently attributed to draughts in the larger offices. Where men are engaged in sorting letters or newspapers, directly in front of a door which is being constantly opened, protection has been afforded by means of wicker screens, but these only protect the individuals most directly exposed.

The passages on the secretary's side are complained of during the winter season, as being extremely cold and draughty. I have recommended a fire-place or stove for warming the air that ascends the passages in question, to be erected at the bottom of the grand staircase.

Scarcely a week passes without complaints being made to me of the bad effects on the general health, or on the eye-sight, of the sorters or other officers employed in the larger offices lighted by gas. I have long been of opinion that the method of lighting these and other large offices is capable of very considerable improvement. The lights are very numerous, and being only eight feet from the floor, there is no attempt made to carry off the great amount of caloric, or the deleterious gases given off in combustion.

The number of officers employed at one time in some of the offices, makes it desirable that some better system of combining more perfect lighting, with good ventilation, should be adopted.

In the Inland Office there are employed, at one time on morning duty, about 467 men; on evening duty, 378 men. The number of gas lamps is 155.

In the newspaper office there are employed at the same time on morning duty, 646 men; on evening duty, 287—gas burners, 145.

The rapid vitiation of the atmosphere in these offices when lighted up may easily be imagined, when it is recollected that each gas burner gives off as much carbonic acid gas as six human beings, besides the sulphurous acid and other impurities. The temperature in some of the offices during the summer was as high as 86° Fahr.

In a special report on the lighting of the larger offices of this department which I presented to you in December last, I pointed out, at the request of the First Commissioner of Works, the

principles that, in my opinion, should be kept in view in lighting rooms or offices where large numbers of persons are collected together. They are the following:—

1. The sources of the light should be as few in number as possible, consistently with the light being sufficiently powerful and equally diffused.

2. The lights should be as elevated as the ceiling will allow.

3. They should be so contrived, that nearly all the heat, as well as the whole products of combustion should be carried off directly, without admixture with the lower strata of air, and be made subservient to an efficient system of ventilation.

4. I am of opinion that the reflective power of metal or other substances might, with economy, be more scientifically employed than is now generally done.

If these principles were carried out in lighting the offices of this department, I believe that very great benefit to the health of a large number of the officers would rapidly result.

VENTILATION OF THE BUILDINGS.—About the end of the year 1855, finding that the various offices situated on the basement floor were in a very unsatisfactory condition with regard to ventilation and aëration, I proposed the laying down a series of tubes for carrying off some of the vitiated air given off by the gas-burners, etc. Considerable benefit was derived from this. A great deal of the dust, so much complained of in the bag-rooms, was carried off through the pipes to the flue of the steam engine, instead of being inhaled by the men.

The walls and ceilings of the bag-rooms and kitchens are no longer blackened, in the course of a few weeks, by the carbon of the imperfectly burned gas. This had long been a source of great mischief to the health of the officers; inducing asthma, bronchitis, and other pulmonary affections. That the officers themselves are sensible of the improvement caused by these measures, is evident from the following communication:—

"Circulation Department, June 21st, 1856.

"SIR,—The bag-room officers, feeling sensible that a considerable improvement has been effected by the system of ventilation lately introduced in the bag department, have requested me to convey to you this acknowledgment, and to thank you on their behalf. Respectfully assuring you, sir, of the pleasure I feel in rendering this testimony to the success which has attended your efforts to promote our health and comfort, I have the honour to be, sir, your humble and obedient servant,

"Dr. Waller Lewis. "WM. WILES."

But, although a certain amount of relief has been experienced

by this partial ventilation, much more is required to be done before the vaults can be pronounced to be in a healthy condition. When the present building was erected, the business of the office was not to be compared with what it has since become, particularly since the uniform low system of postage.

The basement offices, now used as bag-rooms, kitchens, store-rooms, etc., were not intended for habitation, and were consequently not provided with the requirements and conveniences necessary for health and comfort. Fresh air finds its way, with great difficulty, to many of the offices, and to none of them in sufficient quantity. Vaults, cellars, and subterraneous dwellings, even with the best possible modern appliances, are always more injurious to health than rooms on a level with, or above the surrounding soil, and require more than ordinary care and attention to their due aëration and ventilation.

I have conferred with Mr. Cowper, C.E, on the subject of a more systematic and continuous supply of air to the basement offices, and I agree with him in the belief that the steam engine, at present in use, may be advantageously and economically employed for this object.

OLD CAVENDISH STREET BRANCH OFFICE.—Some months ago I reported on the imperfectly ventilated state of this branch. Originally a private dwelling-house, with very low rooms, it was but ill adapted to accommodate the large number of officers who work there. The recommendations I made for the improvement of that office have been promptly carried into effect, to the great satisfaction and benefit of the men.

I am, Sir, your obedient servant,

WALLER LEWIS, F.G.S., etc.

To Rowland Hill, Esq., Secretary G. P. O.

NOTES ON CERTAIN VEGETABLE POISONS.

By WILLIAM PICKELLS, M.D., Cork.

(*Continued from* vol. ii, p. 382.)

HEMLOCK. Dr. Osborne seeks to prove, in answer to some remarks of Dr. Christison, that the State poison (κωνειον) of the Athenians, used in the case of Socrates, was essentially hemlock. The question of the poison used in the case of Socrates, having been so long and so much discussed, may be supposed to have become trite; it appears, however, still to possess an interest, relating, as it does, to the martyrdom of the "prince of philosophers". Dr. Christison had said, in an article published in *The Transactions of the Royal Society of Edinburgh*, that

"the State poison of the Athenians must be considered as producing spasm and coldness of the extremities, gradually advancing to the internal parts; causing death eventually by acting either on the heart or respiration, without affecting the functions of the mind to the very last—a combination of symptoms not to be produced by any poison now known!"

Dr. Osborne meets the difficulty chiefly by a comparative review of the effects of hemlock, according to modern observations, and of the series of symptoms which preceded its fatal effects in the case of Socrates; inferring, "that the resemblance is so close, that no reasonable doubt can be entertained of their being results of the same agency." The last words of Socrates, spoken in the request to Crito, were, he infers, "spoken under the influence of a slight delirium, produced by the hemlock, and to be considered as the results of a narcotic poison." He cites cases to shew that the delirium produced by hemlock is "of a peculiar character, slight—so very slight, in some cases—as to be scarcely sufficient to attract notice."

There is a remarkable passage in Galen, which, as it has occurred to me, may affect the question. "It is to be regretted," he says, "that Plato has not left an answer to the objection to the immortality of the soul, drawn from the delirium of fever, and that produced by the cicuta"; thus instituting an analogy between the two. The objection to the immortality of the soul is, it will be perceived, a mere cavil, a disingenuous carping or play on words (delirium implying alienation of mind), and, if coming from Galen, unworthy of him, whose admirable essays on the *Use of the Parts of the Human Body*, as proving design, have been each in its order appropriately entitled "Hymn to the Divinity!" The passage appears, however, to be available, so far as regards the present question. "No doubt can be entertained," Dr. Osborne says, "of the identity of κωνειον and cicuta. Now the delirium of fever, we know, is commonly not so very slight as not to be well marked; it being often even severe to a degree, rarely, however, furious or maniacal. The last words spoken by Socrates might have been, as we would hope they were, pronounced under the influence of a slight delirium; but that the delirium usually produced by the cicuta was not of a peculiar, very slight, or scarcely noticeable character, is evident from the analogy instituted between it and the delirium of fever, and upon the one species of delirium, as upon the other, a cavil, however captious and frivolous, being raised against the immortality of the soul. Galen derives κωνειον from κωνεω, volvo, whence κωνος, a top; vertigo, it would appear, being a common effect of it.

"A number of writers," Dr. Osborne says, "have been led, one after another, to set down furious delirium as a symptom of poisoning with hemlock. The foundation of this statement rests," he observes, "on the authority of two cases, both unworthy of credit. The first, said to be related by Kircher, given in Wæpfer's treatise *De Cicutâ Aquaticâ* (cicuta virosa), is of two monks, who, after having partaken of a dish composed of the roots of hemlock boiled up with meat, became almost immediately deranged; the one, rushing into a neighbouring lake, called out that he had become a goose; the other ran into the streets, shouting that he was a duck, and required the river to extinguish the fire in his intestines." The story (though there are instances of hallucination or monomania as strange) should certainly be received with suspicion. Supposing it true, however, that the effects were produced by a vegetable poison, it is not sufficiently authenticated that they were produced by hemlock.

In a paper published by me, some years since, in vol. lxvii of the *Edinburgh Medical and Surgical Journal*, on the poisonous effects of the œnanthe crocata, as it occurs in the south of Ireland, a case is given of furious delirium produced by that species of hemlock. "A lad, after having eaten of the root of the plant, mistaking it for celery, ran stark mad, but came to his senses again next morning." The case was given on the authority of "many eye witnesses." In another case, mentioned in same paper, "a woman, living in the town of Dungarvan, having brought home a root of the plant for a poultice, one of the children ate of it, by mistake for a parsnip, and was seized in consequence with risus sardonicus and other symptoms, but recovered by the administration of melted butter."*

The second narrative rejected by Dr. Osborne, as unworthy of credit, is by Matthiolus, of a vine-dresser and his wife, who took hemlock roots in mistake for parsnips. "When they awoke in the night, they became quite furious, wandering about in the dark, and knocking their heads against the walls, so that their faces in the morning were swollen with the effused blood." "It was impossible," it is stated, "for Matthiolus to identify the plant, as the leaves were only beginning to shoot." This

* In mentioning the *Edinburgh Medical and Surgical Journal*, I take the opportunity of correcting an inaccuracy into which I find I fell, in a paper "On Hæmorrhagic Diathesis," published by me in xol. lxxvii of that Journal. In a foot note, p. 6, alluding to certain very bold but ill supported hypotheses, it is said that, to some, the authors might seem to merit the sarcasm applied by Reid, in his Essays, to certain theorists, as in their neomania, or love of paradox, "hunting after bladders of soap in the land of chimera." It should have been, by Helvetius, on Man.

narrative I would not reject as unworthy of credit; but, as the plant could not be identified, would attribute what took place, rather to their having eaten the roots of hyoscyamus, than those of hemlock.

In the paper of mine, already referred to, an instance well authenticated is given, of "a whole family, living at Lambay Island, near Dublin, having been driven mad, attempting to bite everything which came in their way, in consequence of having eaten the roots of hyoscyamus, which had been brought home and boiled as parsnips." "The insane root" of Shakespeare, "that taketh the reason prisoner", is supposed to be the hyoscyamus.

Whatever difficulty may exist, and difficulty, I fear, will still be, in reconciling the physiological action of hemlock on the mind with the account of Plato, it appears, however, pretty certain that hemlock of one species or of the other was, if not the sole, the essential ingredient in the State poison, or κωνειον, of the Athenians; which, used in the cases of Socrates and of other most illustrious men, has brought on the Athenian name, and on popular liberty itself, the stain "of decreeing to the same citizen, the hemlock on one day, and statues on the next." Xenophon, towards the conclusion of the *Memorables*, in reflecting on the death of Socrates, observes: "In my opinion, he met a fate acceptable to the gods; for he left after him the most disagreeable part of life,* and met the easiest of deaths," "τῶν θανάτων τοῦ ῥᾴστου ἔτυχεν." Hence it might appear, that death by the κωνειον was reputed to be the easiest of deaths.†

Condemnation to drink hemlock, as a mode of capital punishment, was not peculiar to the Athenians. It was practised in Massilia, the present Marseilles; a quantity of the expressed juice of the plant being, as at Athens, kept at the public cost, ready to be brewed on occasion. A paragraph has been lately going the round of the newspapers, apparently copied from a Marseilles newspaper, or other source, headed "Curious Law" (curious, indeed, if true). "There was kept in former times, in our city of Marseilles, a poison prepared from hemlock at the public charge, for those who had a mind to hasten their end; they having first, before the Senate, given an account of the reason and motives of their design. It was not otherwise lawful for the citizens to do violence to themselves." Suicide

* He was seventy or eighty years of age.

† The real opinions of Socrates are to be studied rather in Xenophon than in Plato.

was permitted, in certain cases, by some of the ancient philosophers. There were states in which it was even permitted by law.*

In modern history, Eric XIV of Sweden, son of Gustavus Vasa, was put to death by being made to drink hemlock. He had been dethroned by his subjects for cruelty and treachery; and, after an imprisonment of eight years at Gripsholm, "took," it is stated, "a draught of hemlock in 1577, by command of his brother, King John." The species of hemlock used in this case, was doubtless the cicuta virosa; this plant, which appears to prefer a northern or cold habitat, being frequent in the far north of Europe, and also in Siberia.

Wæpfer, in his treatise on the cicuta virosa, above referred to, states that it is poisonous to swine. The professor of agriculture to Queen's College, in this city (Mr. Murphy), informs me that the proprietor of a farm on the river side, near this city, told him that he some time since lost a number of pigs, in consequence of their having eaten of the *œnanthe crocata*, which had been cast ashore in considerable quantities after a flood. The poisonous effects of these species of hemlock on swine are the more remarkable, as in America, swine, it is said, eat the rattle-snakes with impunity; farmers keeping pigs on their lands for the purpose of clearing them of rattle-snakes!

ON THE DISEASES OF COLLIERY OPERATIVES; AND THEIR PREVENTIBLE CAUSES.

By WILLIAM I. COX, M.R.C.S., etc.; Corresponding Member of the Epidemiological Society of London.

(*Concluded from* vol. ii, p. 378.)

HAVING now considered the chief sources of the prevailing physical ailments of colliery operatives, I will briefly conclude this imperfect essay with suggesting a few palliative or remedial measures and aids towards the amelioration of the bodily, and also of the moral condition of this class of artizans.

1. *Baths and Wash-houses.*—"Cleanliness is next to godliness." Corporeal and spiritual uncleanness are in strong affinity and close relationship with each other. It is nearly impossible to over estimate the value of thorough and regular

* Marseilles was founded by the Ionians. Among the constitutions of various states, to which Aristotle refers in his work on Government, is that of Marseilles.

ablution.* To dwell on the advantages of a healthy condition of the skin, and a free, unimpeded performance of its functions, would be, on this occasion, quite unnecessary; but the beneficial results of preserving the cutaneous surface in a normal state, are by no means limited to the maintenance of physical health, to the warding off disease. A human being, living constantly in dirt and filth, never knows self-respect; or, at most, seldom retains its inestimable possession for any long period of time. Rarely, indeed, has such an one the "*os sublime*" to lift erect towards his Maker, proudly and nobly conscious of the heaven-bestowed faculties of reason and intelligence: he feels cowed and debased in the company of his cleanlier and more decent fellow men: he feels the existence of a barrier between himself and them, arising as much from the obvious difference in externals, as in refinement of speech or cultivation of mind. Hence he shuns, rather than seeks, the society of his betters on all occasions, and the unhappy feeling of class distinction thus becomes inveterate amongst colliers (indeed, is far stronger in them than in other artizans) and is readily transmitted from generation to generation, until it becomes apparently in-born.

1. *The establishment of baths and wash-houses* in the immediate neighbourhood of the coal pits, would unquestionably do much to obviate the evils I have alluded to. Their moral influence would not be confined to this. The lax morality and contemptuous indifference towards the maintenance of sexual modesty, which I have spoken of in my first paper as peculiarly characterising both men and women in the coal districts, is partly attributable to the odious and common practice of the youths of both sexes stripping on their return home, and performing their apologies for ablution almost in a state of nudity, in the same apartment, and in open and undisguised view, not only of parents, but of unmarried sisters and brothers, and of adult lodgers. I have frequently been a disgusted witness to these gross and indecent spectacles. I have seen a young unmarried female stripped nearly to the hips, washing herself in the common sitting-room (*house-place*, as it is termed), which contained two full grown male lodgers. I have also frequently seen men similarly exposed in the presence of sisters and female strangers.

The premises necessary could be built and carried on at a very small expense to the proprietors of collieries, and the

* Colliers and their families have in general a horror of water. "Eh, doctor," said a collier's wife on a recent occasion to the writer, "sure, it 's *good wholesome dirt* (!) He 'd be getten the rheumatics if he washed all over; and so often as your 're wishing, 'tant gradely for coalers, I tell 'ee."

pecuniary cost would be amply compensated in the improved moral and physical status of the workpeople. In most *plants* there is generally one shaft needing continual pumping, and the water so raised (and which is now deemed a troublesome nuisance, difficult to be got rid of) might be readily turned into a reservoir, and after, perhaps, some necessary cheap filtering, be heated for the bath at a trifling cost.

The programme of the operative's day may be as follows :— In the morning, having reached the works, he enters a room adjoining the bath, puts on his pit dress—leaving his house garments in its place: he then proceeds to the scene of his labours. On coming up from the pit at the conclusion of his day's work, he repairs to the building, divests himself of his pit clothes, plunges into the bath ; and, after a brief but thorough ablution in the water (which in the summer may be at the common temperature, but should be heated during the winter to 90°), dresses himself once more in the ordinary clothes which he put off in the morning on his arrival. Now, by this arrangement, the operative (*a*) is secured a free and healthy action of the skin, as far as that *can* be done by external measures ; and (*b*) he is not compelled to appear in the streets, in his way to and from work, in his rude and unseemly pit habiliments. If it be objected that this programme involves a certain amount of trouble in changing clothes, etc., which by the workmen may be deemed irksome and unnecessary, such an alleged obstacle to its adoption will disappear on examination ; for it is *now* the almost universal custom amongst them to throw off the cumbersome pit dress, and put on their ordinary garments on returning home.*

2. *Improved Dwellings.*—A vast improvement in the social habits and physical welfare of the operatives would, doubtless, be effected by their provision with healthy, well ventilated dwellings, and a cheap, thorough water supply where this great desideratum is deficient. It is much to be regretted that the system at work in the Welsh and Monmouthshire coal fields (the colliers being there resident in cottages built by the masters in the immediate neighbourhood of the works) is not generally adopted in Lancashire. The operatives here live wherever they can find what they deem suitable residences. Vain are nearly all the attempts to better the condition of a class, whilst their homes are so grossly neglected. It is the error of many benevolent and well-intentioned philanthropists of the present

* The author will be happy to forward (on application) a small sketch or plan of the proposed building. He could not, of course, encroach on the space of this Journal by its introduction.

day to suppose that the self-denying virtues of temperance, of sobriety, of chastity, can be planted with success in the habitations of wretchedness, and their flourishing and permanent growth secured by oaths and vows. A sad mistake! In dwellings offensive to every sense, and among human beings embruted by constant intemperance, and surrounded by every species of bodily uncleanness, "no salutary plant takes root;" or if, indeed, obtaining a transient hold, speedily withers in a soil so adverse, in an atmosphere so ungenial. And here let me remark, that no one at a distance, and personally unacquainted with the actual condition and requirements of the poorer classes, can be possibly in a position to judge correctly on these important questions. However unpalatable the task, one must mix with and observe, and that with unprejudiced vision, ere one can venture to indicate the real sources of evil, and suggest preventives. The medical man, the general practitioner in humble life in many an obscure village or filthy haunt of the bustling city, becomes (provided he be ordinarily gifted and worthy his calling) a fitter judge of the remediable evils affecting the lives of the people, than probably one-half the members of both Houses. It is ever thus in the search for knowledge of true practicable value. Would anyone pick up precious truths? He must bend down and look for them—it may be even in the mire and slough of human wickedness and woe. Everywhere the "pearl of great price" is hidden and embedded in a shell, which has no form or comeliness; and knowledge of this kind, likely to benefit the future, is cumulative, of slow growth, piled up by little and little, won by untiring perseverance, by patient labour.

3. *Abolition of Female Labour.*—The abomination of female *employées* at the mouth (or brow, as it is called) of the shafts, wearing the male garb, should be swept away. I have already spoken of the utter demoralisation and destruction of all self-respect and sense of female shame, that *directly* results from this revolting usage; and the evil effects are, of course, not limited to the persons of the female operatives. The bodily welfare and moral *status* of their husbands (or of the men with whom they live in concubinage), are thereby indirectly lowered and deteriorated. These women sink into a condition of moral hermaphroditism—partaking of the mental characteristics of both sexes, in the coarser, baser, and more corrupt manifestations, but destitute of the virtues that should adorn either. The state of mind and morals reacts on the physical condition, and thus their unhappy offspring necessarily suffer from their degeneracy. Until a welcome Act of Parliament shall for ever forbid the

employment of females (in any garb) at, or near, coal pits; a powerful check might be given to the maintenance of the system by the masters refusing their labour, as far as possible, and in other ways throwing the utmost discouragement on a custom so much "more honoured in the breach than in the observance." Moral suasion in this, as in other matters, would do much, if steadily enforced.

4. *Schools, Classes, and Lectures.*—It is much to be feared that but little can be anticipated in the way of elevating the mental condition of colliers and miners, until legislative enactments shall lay the foundation (as indubitably they ought to have done long since) of a simple, but permanent educational plan. We have been, indeed, long awaiting, and in vain, the advent of some Government measure, some scheme of tuition, which might happily disperse the Cimmerian gloom of popular ignorance and depravity which broods, *par excellence*, over the coal fields of Northern England. The question, "when will it come?" is yet unanswered. How long are we to remain indignant in *statu quo*, whilst waspish senators bandy personal sarcasms in the chambers of the legislature; whilst youthful lordlings exercise their polished weapons of wit and *repartie* upon some idle question; whilst pompous declamators, enraptured with the charms of their own vapid eloquence, dilate at weary length on the "visionary schemes" of the unflinching and earnest advocates of peace, sobriety, and sanitary reform; whilst frothy sophists sneer at education for the masses, and hold up beer—that curse of the labourer of every class—to universal admiration as "liquid bread"? Meanwhile, we live in a moral chaos. Respectable citizens daily run the hazard of *garottement* in the public streets! The unfortunate artizan lives, breeds, and rots in a filty hovel; his offspring, with no knowledge of God or respect for man, make rapid and unheeded strides to the possession of their dark inheritance of woe and crime, through an unnatural childhood, passed in a home revolting to every well-trained sense; the germs of every zymotic poison grow strong, and multiply in the atmosphere of the hideous den, the squalid court, the foul and reeking sewer. And, worst of all still, the untended precocious bud of youthful passion is, in both sexes, forced and blighted into ghastly shapes, in the hot polluting air, stagnant in homes of physical and moral corruption. But this is by-the-bye. *Revenons à nos moutons.* Why, I may ask, have we not, at all events, a bill rendering the school education of the children of colliery operatives compulsory at a certain age, as it is already with respect to the offspring of factory spinners and weavers? The alleged interference with natural rights of parents and guardians is not

greater in the one case than in the other. My own experience in the peculiarities of temper and character in colliers (at least, in Lancashire) has convinced me that it is now nearly hopeless to leave the training of the rising generation in the hands of their natural protectors. The parents themselves, having received no education, are prejudiced against it. They have no faith in its advantages, and, generally speaking, despise it, and will not have their children taught or instructed by others if they can avoid it.

Yet, in the mean time, much may be hoped from the establishment of small schools by the masters, in the near vicinity of the operatives' cottages, for the children of the workmen, and more especially by forming evening classes or adult schools (with the delivery of lectures) for the operatives themselves. The advantage derivable from this last-named measure being, that the parents learning by their own experience of its advantages to estimate, however feebly, the blessings of knowledge, discard their former prejudices, and become desirous to secure for their children similar benefits. The truth of this assertion, and a good illustration of the success attending persevering effort (if but slight and partial) towards the amelioration of the collier's social condition, has been afforded in my own neighbourhood. A highly respectable firm of coal owners, the active and managing partner of whom is a gentleman much impressed with the moral deficiencies of the *employés*, and strongly desirous of their permanent benefit, established, recently, a day school for children, which for some time struggled on with but small results that could be deemed satisfactory. Then an evening lecture was set on foot, to be delivered weekly; the incumbent of the district and his zealous and excellent curate kindly undertaking the duty alternately. Now, soon after the commencement of these lectures, the attendance at the children's school was observed to improve, and the numbers to increase, and up to the present time *continues* to improve. The school instruction, however, should not be a free gift. A small charge should be made for each child; for these people, with a species of pride somewhat peculiar, and conscious of being really able to pay, cherish a kind of disdain towards all things gratuitous, every absolute *bonus*. It is found that lectures with free admission rarely succeed in the coal districts; but entertainments of that class, necessitating the outlay of two-pence or three-pence are generally well attended; but these, indeed, are seldom offered.

I would suggest that, in addition to these evening lectures (which, being delivered by clergymen, and in a district situate somewhat remotely from places of public worship, were, in the

case referred to, perhaps very properly, limited exclusively to topics of religious instruction), discourses should also be delivered to the men in the winter evenings, on popular science, on the ordinary phenomena of the domestic and work-day life, in a familiar style, and in language devoid of technicalities, and adapted to the comprehension of the hearers. Thus a taste for the acquisition of knowledge would be created; this taste subsequently nourished and elevated; and the accursed beer-house, the publican's parlour, gradually forsaken. The poison would then have its antidote near at hand. Unquestionably a large amount of existing improvidence, folly, waste, sensuality, disease, nay, wickedness, in society, may justly be attributed to the deplorable ignorance which prevails, respecting the laws which regulate our being; which govern our *physical* welfare, and by which so large a portion of the *moral* universe is swayed. What most concerns the things which occupy his attention in his daily life, is, during his childhood and youth, sedulously kept from the knowledge of the working man.

Nor should our endeavours to infuse a little useful knowledge among the adult operative class be confined to the men. The women are even more ignorant; and, for obvious reasons, it is yet more important that *they* should be instructed in the duties of life; in the plain rules of conduct by which female life should be regulated. "All would be well, indeed," says Southwood Smith, "if the marriage ceremony, which converts the girl into a wife, conferred upon the wife the qualities which should be possessed by the mother." But it is very rare to find a young female capable of even the least trying part of early training. Yet a girl brought up in the ordinary mode, and in the domestic circle of her class, environed by all the corrupting agents on which I have dwelt, and with scarcely a redeeming or wholesome influence, is at the age of eighteen or nineteen entrusted with the direction and control of the earliest impressions that are made upon the human being; and the mighty and permanent physical, moral, and intellectual results, that arise out of those impressions! Female classes should be formed; to consist of the wives and daughters of colliers, and directed by such ladies of the neighbourhood as are willing and capable to aid in such a good work. These classes should teach—not the *accomplishments* of domestic life, not music or dancing, or frivolous crochet—but a fitness for the earnest work, the solemn duties of existence: cooking, the fabrication of children's clothes (which very few females of this class understand), domestic economy, how to reclaim an erring husband, how to secure and direct aright the affections of a child.

I have now sketched, in rapid outline, the most obvious and practicable modes of procedure, whereby the condition of a very large and interesting section of our labouring population may be materially improved, and their moral standard permanently raised. I have shown that there is much in the power of the masters to achieve. Let us hope that *they* will henceforth devote to the subject that serious attention which it merits at their hands. Their wealth-producers may surely claim their sympathies, their aid, direction, and co-operation, in whatever promises to benefit their condition, and promote their welfare. Moreover, the employers themselves, in a worldly point of view, are interested in the matter. Is a sickly and debased workman of the same value (as a wealth-producer) as one of healthy tone, both of mind and body? Assuredly not. But let us not pursue this line of argument. This is an age of sublime conflict; of the war of intelligence and philanthropy with all the foul protean forms of ignorance. Peaceful science has its victories as well as war. Its trophies are increase of rational enjoyment and happiness among the masses, healthy dwellings, a smiling infancy, a well-trained youth, a contented populace, a diminished mortality. The professors of the healing art, battling with disease and misery, waging eternal conflict against bodily and spiritual uncleanness; and enforcing, through good report and through evil report, the principles and practical application of sanitary reform, have already obtained, and shall continue to reap, more glorious conquests than red-handed Mars—victories over the direst enemies to man's advancement, the bitterest foes to human progress; compared with which, the fields of Marathon, of Bannockburn, of Waterloo, shall pale their splendour. What does Byron say?—

> "The drying of a single tear, has more
> Of honest fame than shedding seas of gore."

Hindley, near Wigan, 1856.

NOTES ON THE METEOROLOGY AND EPIDEMICS OF THE SEVENTEENTH CENTURY.

By J. M. WINN, M.D., F.R.C.P., etc.

SCATTERED throughout Evelyn's interesting diary, which extends over a great part of the seventeenth century, and intermixed with a variety of miscellaneous matters, are numerous observations on the weather and the prevailing epidemics. In the year 1848, I was at considerable pains to collect the whole of these isolated observations, and to arrange them in some sort of order for the Royal Institution of Cornwall. That

society did me the honour of printing them in its annual report. The great impulse which has lately been given to sanitary science through the SANITARY REVIEW and the continued labours of the Epidemiological Society, has induced me to bring the subject once more before the public. I have subjoined these observations of Evelyn; and I am gratified to find that, although his remarks are not made with scientific accuracy, they are sufficiently precise to give us a general view of the climate of Britain, during a period remarkable for serious epidemics and extraordinary atmospherical changes.

I have not abbreviated Evelyn's observations, considering it better to present them in his own quaint, yet forcible style. They do not require comment; there are, however, some facts of such striking importance to be found in the Diary, that I cannot refrain from directing especial attention to them.

In 1652, a very remarkable drought of four months duration occurred. In 1675, an epidemic catarrh (influenza) appeared, after a dry summer. In 1683 and 1695, the small pox was rife, during very cold weather, in December and January. The year 1692 was remarkable for a drought in Ireland, while the weather was unusually wet in England. In 1695, very severe frosts occurred early in the month of August. It is also worthy of notice that the very severe winters of 1684 and 1685 were followed by unusually dry springs. In 1679, the autumn was wet and sickly. In 1686, storms, followed by excessive heat in June, produced sickness in the camp at Hounslow Heath. During a dry frost, in January, 1692, an unusual number of people died of apoplexy. 1693 was remarkable for being both wet and salubrious.

It may be hoped that an attentive comparison of the annexed extracts from Evelyn's *Journal*, with the more modern observations of the Royal Society, with commenced in 1773, will throw some light on the laws which govern the weather, and perhaps confirm the theory of cycles in the seasons. It would also be interesting to compare some observations by Walter Mede in the fourteenth century, the MS. copy of which is said to be deposited in the Bodleian Library.

It is deserving of remark, that, on adding together the number of years which have elapsed between the severe frost of 1685 and the severe winter of 1846, and dividing the amount by seven, there is no remainder. This fact would appear to corroborate the theory of Mr. Luke Howard, that there is a cycle of seven years in the seasons of Great Britain:—

"1652. March 25.* After a drowth of near four months,

* These extracts are taken from the second edition of EVELYN'S Memoirs,

there fell so violent a tempest of hail, rain, wind, thunder and lightning, as no man had seen the like in this age, the hail being in some places four or five inches about, brake all the glass about London.

"1656. July 7. Very hot and dusty.

"1657. July 21. Fell a most prodigious rain in London, and the year was very sickly.

"1658. March 7. This had been the severest winter that any man alive had known in England. The crowes feet were frozen to their prey. Islands of ice enclosed both fish and fowl frozen, and some persons in their boats.—May 15. An epidemical sickness very mortal this spring.—June 2. An extraordinary storm of hail and rain; the season is cold as winter, the wind northerly for six months.—August 18. Strong S.W. wind (which blew down the greatest trees) all night till 3 in the morning.

"1661. September 18. An exceeding sickly and wet autumn.

"1662. January 16. There had fallen great rain without any frost or seasonable cold in England, Sweden, and the northern parts, being near as warm as midsummer in some years.—February 17. Unparalleled storm of hail, thunder, and lightning.—December 1. Thames frozen, flakes of ice encompassing our boat.

"1663. July 16. Extraordinary wet and cold season.

"1664. December 22. Exceeding cold, and a hard, long, frosty season.

"1665. January 4. Excessive sharp frost and snow.—Jan 12. Returned home, after a cold journey.—July 16. There died of the plague in London this week 1,100, and in the week following about 2,100.

"1666. January 12. The contagion, though exceedingly abated, not as yet wholly extinguished.—February 6. Contagion now almost universally ceasing.—April 15. Our parish more infected than ever, though the plague has almost ceased in London.—July 22. Our parish still infected.—July 29. The pestilence now afresh increasing in our parish.—August 26. The contagion still continuing in our parish.—September 2. The great fire in London.—September 7. The plague continuing in our parish.—October 21. This season, after so long and extraordinarie drowth in August and September, as if preparatory for the dreadful fire, was so very wet and rainy as many feared an ensuing famine.—October 28. The pestilence begun to abate in our town.

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edited by W. Bray, Esq., Fellow of the Society of Antiquaries. London: published from the original MSS. in 1810.

"1667. March 6. Great frosts, snow, and wind, prodigious at the vernal equinox.—April 4. The cold so intense that there was hardly a leaf on a tree.

"1671. January 21. This yeare the weather was so wet, stormy, and unseasonable, as had not been known for many yeares.—September 13. A dreadful tempest.

"1672. February 3. An extraordinary snow.

"1675. October 15. I got an extreme cold, such as was afterwards so epidemical-rife over all Europe like a plague. It was after an exceeding dry summer and autumn.

"1676. December 10. There fell so deep a snow as hindered us from church.—December 12. To London, in so deep a snow as I remember not to have seen the like.—December 17. More snow falling, I was not able to get to church.

"1679. October. Very wet and sickly season.

"1680. December 12. After many daies of snow, cloudy and dark weather, the comet was very much wasted.

"1681. March 27. An extraordinary sharp cold spring, not yet a leaf on y^e^ trees, frost and snow lying.—April 29. But one shower of rain all this month.—May 25. There had scarce fallen any rain since Christmas.—June 12. It still continued so great a drought as had never been known in England, and it was said to be universal.

"1682. April. The season was unusually wet, with rain and thunder.

"1683. March was unusually hot and dry, and all April excessively wet.—December 23. The small pox very prevalent and mortal; the Thames frozen.—December 27. In England this year one of the severest frosts that had happened of many years.

"1684. January 1. The weather continuing tolerably severe, streets of booths were set upon the Thames; the air was so very cold and thick as for many years there had not been the like. The small pox was very mortal.—January 6. The river quite frozen.—January 9. I went cross the Thames on the ice.—January 16. Thames filled with people and tents.—January 24. Frost continuing more and more severe. Trees not only splitting as if lightning struck, but men and cattle perishing in divers places. London, by reason of the excessive coldness of the air hindering the ascent of the smoke, was so filled with the fuliginous steam of the sea-coale.—February 4. I went to Say's Court to see how the frost had dealt with my garden. The oranges and mirtills very sick, the rosemary and laurels dead to all appearance, but the cypress likely to endure it.—February 5. It began to thaw, but froze again.—February 6. The weather was set in to an absolute thaw, but the Thames still frozen.—February 10. After eight weeks missing

the foraine posts, there came abundance of intelligence from abroad.—April 4. Hardly the least appearance of any spring.—July 2. There had been an excessive hot and dry spring, and such a drought continued as never was in my memorie.—July 13. Some small sprinkling of rain; the leaves dropping from the trees as in autumn.—August 10. We had now rain after such a drowth as no man in England had known.—August 24. Excessive hot; we had not above one or two considerable showers, and those storms these eight or nine months, many trees died for want of refreshment.—November 2. A sudden change from temperate warm weather to an excessive cold raine, snow, and storm, such as had seldom been known. This winter began as early and fierce as the past did late; till about Christmas there had been hardly any winter.

"1685. January 1. It prov'd so sharp weather, and so long and cruel a frost, that the Thames was frozen across; but the frost was often dissolv'd and then froze again.—June 14. Such a dearth for want of rain was never in my memory.—June 17. The exceeding drowth continues.—June 28. We had now plentiful raine, after two years excessive drowth and severe winters.—November 5. An extraordinary wett morning.—November 22. Hitherto was a very wett, warm season.—December. The winter had hitherto been extraordinary wett and mild.

"1686. January 19. So wet and mild winter had scarcely been seen in man's memory.—June 2. Such storms, raine, and foul weather, seldom known at this time of the yeare. The camp at Hounslow Heath, from sickness and other inconveniences of weather, forced to retire to quarters; the storms being succeeded by excessive hot weather, many grew sick.—June 20. An extraordinary season of violent and sudden raine.—July 13. The season very rainy.—December 29. Little appearance of any winter as yet.

"1687. May 12. This day there was such a storme of winde as had seldom happened, being a sort of hurricane. It kept the flood out of the Thames, so that people went on foote over several places above bridge: also, an earthquake in severall places in England about the time of the storme.

"1688. April 15. A dry, cold, backward spring; easterly winds.—April 29. The weather was, till now, so cold and sharp, by an almost perpetual east wind which had continued many monthes, that there was little appearance of any spring, and yet the winter was very favourable as to frost and snow.

"1689. January 7. A long frost and deepe snow; the Thames almost frozen over.—April 21. This was one of the most seasonable springs, free from the usual sharp east winds,

that I have observed since the 1660.—June 23. An extraordinary drowth, to the threatening of greate wants as to the fruits of the earth.—November 10. After a very wet season, the winter came on severely.—March 17. Much wet without frost, yet the wind north and easterly.

"1690. January 11. This night there was a most extraordinary storme of wind with snow. This winter, hitherto, has been extremely wet, warm, and windy.—August 16. Unseasonable and most tempestuous weather. August 17. An extraordinary sharp, cold east wind.—November 16. Exceeding greate storms, yet a warm season.—December 20. Most of this month cold and frost.

"1691. July 26. Extraordinary hot season, yet refreshed by some thunder showers.—September 23. A great storm at sea: we lost the *Coronation* and *Harwich*.—October 14. A most pleasant autumn.—November 8 to 30. An extraordinary dry and warm season; without frost, and like a new spring, such as had not been known for many yeares.—December 26. An exceeding dry and calm winter; no rain for many months past.

"1692. January 24. A frosty and dry season continued; many persons die of apoplexy; more than usual.—February 7. An extraordinary snow fell in most parts.—April. No spring yet appearing. April 24th. Very cold and unreasonable weather, scarce a leaf on the trees.—June 9. An exceeding great storm of wind and rain. An extraordinary wet season, with greate floods.—July 25. This whole summer was exceeding wet and rainy, the like had not been known since the year 1643; *whilst in Ireland they had not known so great a drowth*.—August 14. Still an exceeding wet season.—September 15. There happened an earthquake.—October 1. This season was so exceedingly cold, by reason of a very long and tempestuous north-east wind, that this usually pleasant season was very uncomfortable. No fruit ripened kindly.

"1693. February 26. An extraordinary deep snow after almost no winter, and a sudden gentle thaw.—April 23. An extraordinary wet spring.—June 24. A very wet hay harvest, and little summer as yet.—August 1. Very lovely harvest weather, and a wholesome season; but no garden fruit.—October 31. The season continued very wet, as it had nearly all the summer (if one might call it summer), in which there was no fruit, but corn was very plentiful.—December 10. Very greate storm, with thunder and lightning.

"1694. April 24. The whole month of April without rain! —May 6. Scarcely one shower has fallen since the beginning of April. May 13th. Some refreshing showers.—June 3.

Seasonable showers; corn and all fruits in extraordinary plenty, generally.—July. Glorious steady weather.—August 5.—Stormy and unseasonable wet weather this week.—November 22. A very sickly time, especially the small pox.

"1695. January 13. The Thames was frozen over. The deaths by small pox increased to 500 more than in the preceding week. January 20th. The frost and continual snow has now lasted nearly five weeks.—February. The long frost intermitted, but not gone.—March. The latter end of this month sharp and severe cold, with much snow and hard frost; no appearance of spring.—April 14. After a most severe, cold, and snowy winter, without, almost, any shower for many months, the wind continuing N. and E., and not a leafe appearing; the weather and wind now changed; some showers fell, and there was a remission of cold. April 21st. The spring begins to appear, yet the trees hardly leafed.—July 28. A very wet season.—August 11. *The weather now so cold, that greater frosts were not always seen in the midst of winter;* this succeeded much wet, and set harvest extremely back. July 29. Very cold weather.—December 25. Hitherto mild, dark, misty weather; now snow and frost.

"1696. February 2. An extraordinary wet season, though temperate as to cold.—March 1. The wind continuing N. and E. all this week. March 8th. Great frost and cold.—April 12. A very fine spring season.—June 21. An exceeding rainy, cold, unseasonable summer; yet the city was very healthy.—July 7. A northern wind altering the weather, with a continual and impetuous raine of three days and nights; changed into perfect winter. July 12. Very unseasonable and uncertain weather.—September. Fine, seasonable weather, and a great harvest after a cold, wet summer. Scarcity in Scotland. —October 24. Unreasonable, stormy weather, and an ill seed time.—November 9. Frost began fiercely, but lasted not long. November 15 to 23. Very stormy weather; rain and inundations.—December 13. Continuance of extreme frost and snow.

"1697. January 17. The severe frost and weather relented; but again froze, with snow.—February 7. Severe frost continued, with snow. Souldiers in the armies and garrison towns frozen to death on their posts.—September. Very bright weather, but with sharp east wind.—October 3. So greate was the storms all this week, that neere a 1,000 people were lost going into the *Texel.*

"1698. April 21. An exceeding sharp and cold season.—May 8. An extraordinary greate snow and frost, nipping the corn and other fruits. Corn at nine shillings a bushel.—December 18. Very warm, but exceeding stormy.

"1699. February 19. A most furious wind as has not happened for many years.—March 26. After an extraordinary storm, there came up the Thames a whale, which was fifty-six feet long.—June 11. After a long drowth, we had a refreshing shower. June 25. The heat has been so great almost all this month, that I do not remember to have felt much greater in Italy, and this after a winter the wettest, though not the coldest that I remember for fifty yeares last past.—July 23. Seasonable showers after a continuance of excessive drowth and heat. —October 21. After an unusual warm and pleasant season, we were surprized with a very sharp frost.—November 24. A gentle, calm, dry, temperate weather all this season of the yeare, but now came sharp, hard frost and mist, but calm.—November 25. There happened this week so thick a mist and fog, that people lost their way in the streets.—Dec. 3. Calm, bright, and warm as in the middle of April. So continued on 21st Jan.

"1700. January 25. The weather was now altering into sharp and hard frost.—February 18. Mild and calm season, with gentle frost and little misling rain.—March 8. The season was like April for warmth and mildness. March 24. The season warm, gentle, and exceeding pleasant.—April 24. A most glorious spring, with hope of abundance of fruit of all kinds, and a propitious yeare.—June 2. A sweet season, with a mixture of refreshing showers.

"1701. January 4. An exceeding deepe snow, and melted away as suddenly. January 19. Severe frost, and such a tempest as threw down many chimnies.—May. A great dearth, no considerable raine having fallen for some months. May 17. Very plentifull showers, the wind coming west and south. —August. The weather changed from heate, not much less than in Italy or Spain for some days, to wet, dripping, and cold, with intermissions of faire.

"1703. Corn and provisions so cheap, that the farmers are unable to pay their rents.—June 13. Rains have been greate and continual, and now (neare Midsummer) cold and wet.— July 25. The last week in this month an uncommon long-continued rain, and the Sunday following thunder and lightning. —November 21. The wet and uncomfortable weather staying us from church this morning. November 26 and 27. The effects of the hurricane, and tempest of wind, rain, and lightning through all the nation, especially London, were very dismal.

"1704. This year has been very plentiful.

"1705. February 21. Remarkable fine weather. Agues and small pox much in every place.—March 11. An exceeding dry season.—June. The season very dry and hot."

GRAVE-YARD STATISTICS OF WARWICK AND LEAMINGTON.

By JOHN WEBSTER, M.D., F.R.S., etc.

HAVING lately occasion to visit Warwickshire, I occupied myself, during several leisure hours, with examining the gravestone records of Warwick and Leamington; thus carrying out, in these adjacent districts, inquiries analogous to those reported in previous numbers of this Review.

According to existing memorials in the churchyards of Warwick, from eighty to ninety years appear to be not uncommon ages; several exceeded that period; while one woman, buried in the St. Nicholas cemetery, had attained ninety-two at death. Contrasted with Warwick, the burying-grounds of Leamington indicated much lower ages; no individual buried in any cemetery in Leamington is named as having reached ninety years, as far as I could ascertain; eighty-eight being the highest figure reported on any grave-stone.

A more conclusive proof, shewing the inferior position occupied by Leamington in any longevity scale, may be adduced from its local registers of deaths, which were purposely inspected. At Warwick, twenty persons from eighty years and upwards—of whom one was ninety-one, and another ninety-two at death—have been interred, within the last eighteen months; at Leamington, only nine persons, who had lived to eighty and beyond that age, were similarly registered, the oldest being eighty-nine, a female. Possessing nearly double the population of Warwick, if long life prevailed amongst its inhabitants to the same extent, Leamington ought to have furnished about *forty* octogenarians, or persons even upwards of that advanced period; or, in other words, a quadruple proportion.

A feature illustrating the salubrity of Warwick, especially when it is contrasted with many other towns, is the small proportion of deaths recorded amongst its juvenile population; viz. those under five years of age. From an abstract of the parish registers of St. Nicholas, Warwick (with which I have been kindly favoured by the present incumbent), I find that amongst the inhabitants—who now range about 4,200—during the last fifteen years, the average proportion of young persons, under five years, buried there, was only 32 per cent out of 1396; whilst in many English towns, the ratio often reaches forty-five and fifty per hundred. Nay, this ratio is occasionally even greater; for in the neighbouring town of Coventry, during the last quarter, the registrar of the Holy Trinity district reported that, "out of the total of 156 deaths, 109 were of children under

five years of age"; *i. e.* the high ratio of nearly 70 per cent. During the identical period of fifteen years, ending on the 31st of last December, seventy-one persons, whose ages varied from eighty to ninety, were interred, according to the St. Nicholas registers; besides fourteen others, who are reported between ninety and ninety-nine at death. None, however, had actually become centenarians.

Another important fact in favour of Warwick is, that more aged individuals are now living in the above town than in Leamington; notwithstanding the oldest living inhabitant of the Spa district, or Leamington, is a lady at present in her ninety-third year. Numerous cogent reasons might be easily adduced, explanatory of the differences just stated. Warwick stands on a rocky hill, having an acclivity, which, though somewhat abrupt, is not considerable, and the position otherwise appears favourable; while, in several of its streets, there prevails free ventilation. Leamington, on the contrary, occupies a clayey soil, lies low in many places, and is near to the banks of a muddy, sluggish stream, which cannot but be insalubrious, notwithstanding several adjoining medicinal springs have become famous in public estimation, and however beneficial they may be in the alleviation or cure of various complaints. Further, its situation, particularly in the lower and most populous part, is somewhat damp; while luxuriantly foliaged trees often grow rather close to numerous elegant, yet in many respects healthy villas, and even in wide, open streets. The above causes materially influence the salubrity of this town, and likewise the longevity of residents.

In conclusion, I would observe that sufficient proofs are here specified to warrant the inference that Warwick is a more salubrious and preferable residence than Leamington Priors; although the latter is now frequently resorted to by invalids for the restoration of their health; and by other persons, who select this favourite retreat, in order to enjoy comfort and tranquillity, during the evening of life, in an urban yet rural region; which is not only rendered beautiful by its fertile and wooded landscapes, interspersed with country seats of resident gentry, but is in many respects historically interesting, more especially from its being in the native county of England's greatest bard, and human nature's truest delineator—the immortal Shakespeare.

24, Brook Street, March 1857.

ON THE DRAINAGE OF THE METROPOLIS BY A CONTINUOUS WATER FLOW.*

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THE question of the drainage of the metropolis has now been under consideration for twelve months by a Board expressly constituted for the purpose of its solution, without advancing a single step towards the accomplishment of that object. The cause of this shortcoming is manifestly attributable, not to any deficiency in plain practical common sense or in engineering skill, but to the absence of that essential in their deliberations upon a purely sanitary question—a knowledge of sanitary science, and to a consequent absence of data upon which either a correct system could be founded by the engineer, or a correct judgment of such or any system could be arrived at by its members. It is evident, and to be regretted, that this hiatus in their counsels was not recognised; otherwise it would have been at once apparent, to the saving of much valuable time (and, it may be added, to the verification of the Roman proverb, "ne sutor ultra crepidam"), that the operations of the engineer could only be subservient to certain purposes; which purposes, being sanitary ones, it would devolve upon those whose scientific attainments entitle them to be the exponents of the laws relating to the promotion of health and the prevention of disease, and not the engineer or themselves, to determine. In other words, it would be necessary—1. To determine the conditions which sanitary science demands for the accomplishment of the object to which drainage is applied, namely, the preservation of the public health; and 2. To project the skill of the engineer to the complete fulfilment of those conditions.

However much the present tendency of popular opinion may be to confuse the subject by considerations of false economy, the question is undoubtedly a sanitary one, and is embraced in the above two propositions. If the before named conditions be satisfactorily determined and defined, there can be no doubt that more than sufficient engineering skill† exists for their fulfilment; but, unless such requirements be first fully entertained, it is equally doubtless that the operations of the engineer will form but a grand mass of fruitless ingenuity.

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* The substance of the following remarks was addressed to the Metropolitan Association of Medical Officers of Health, at a meeting held on Jan. 28, 1857.

† Sir Wm. Cubitt and Mr. Stephenson, in their Report of the 11th Dec. 1854, state: "No part of engineering science has been more industriously investigated than the laws which govern the flow of water in pipes and open channels", etc.

The initiative consideration of the subject peculiarly belongs to the province of the medical officer of health. I trust I need offer no excuse, therefore, in soliciting earnest attention to the subject; inasmuch as it would appear but inconsistent with the objects of this Association, that its members—the elected guardians of the public health—should remain inactive, in a matter which so deeply concerns their public duties.

Apart from these considerations, the subject is most worthy of attention for its own merits, the importance of which cannot be overestimated; for of all the causes operating to the increase of the Bills of Mortality, within the official cognisance of the medical officer of health, imperfect drainage is one of the most, if not the most, potent; while it is at the same time the most easily recognised, the most easy (as I believe) to be remedied, and, when remedied, the most productive of beneficial results. For how comparatively trifling, and slow, and gradual, must necessarily be the process which can ever be expected to be realised in the alleviation of other sanitary evils, such as the sale of adulterated and unwholesome food, the dampness, uncleanness, bad ventilation, and especially overcrowding of houses, etc., in comparison with the great and immediate beneficial results to be derived from a perfect system of drainage, the establishment and subsequent working of which can be effected without being obstructed by the trammels of private interest, and that vast amount of ignorance and prejudice, which stand in the way of the removal of other sanitary evils, such as I have just mentioned. The importance of the subject need not be further urged: it admits of no denial.

In the consideration of this, as of every other subject, correct conclusions can only be educed from true premises. A sound foundation is necessary for a firm superstructure. With this view, I take for a basis the well established fact, as evidenced in the returns of the Registrar-General, and confirmed by all experience; viz., that every population living in an atmosphere rendered impure by those gases which result from the retention, and consequent decomposition, of the excreta of the community, beneath or in the vicinity of its habitations (as in cesspools, or imperfect sewers or drains), becomes subject to a lowered vitality, and prone to the reception of disease, especially that of an epidemic or contagious nature. Therefore,—

1. The existence of a means by which the removal of the ordure of the metropolis may be accomplished, is a paramount necessity for the health of its inhabitants.

2. This removal must be immediate, in order to preclude decomposition and its resulting evils.

3. The means of this removal must be inoffensive in itself.

4. In the adaptation of this means for the prompt and inoffensive defæcation of the town is comprised the entire object of drainage.

These are the data which it has appeared to me essentially necessary to keep prominently in view, in any attempt at arriving at a plain, true, and practical exposition of the subject. But, before proceeding to deduce conclusions from them, it will be well first to see what assistance history furnishes on the subject.

The earliest reference to the subject is found in the Mosaic laws, relating to the observance of cleanliness by the army when encamped; it was here ordained that each individual should go forth without the camp, and, with a paddle adapted to his weapon for the purpose, inter his own ordure.*

That a somewhat similar custom was almost universal at the time of Herodotus, may be inferred from the circumstance of that author mentioning, as one of the peculiarities of the habits of the Egyptians, by which they differed from other nations, that they "discharged their excrements at home."† Here it may be remarked, that the present cesspool system, which prevails generally in modern civilised life, but which has of late been so wisely interdicted in this metropolis, would appear to be but a modification of the foregoing custom, localised by necessities resulting from a town life.

The Chinese, who have retained most of their ancient customs to the present time, furnish the next departure from the *outdoor* custom. Regardless of sanitary considerations, they store their ordure in tubs (portable cesspools), for the purpose of selling it to the rustics, who come into town every morning to collect and buy it at so much the pound. The laws of the State forbid that any should be thrown away; for, in consequence of the scarcity of cattle, it becomes very valuable as manure. They are the most industrious of agriculturists.

The Athenians, with whom civilisation had greatly advanced in the time of Solon, do not appear to have possessed any works of drainage; otherwise reference to them would doubtless be discoverable amongst the many social laws of that great lawgiver.

It was reserved for the wisdom of the Romans to emancipate man from habits which so nearly allied him to the animal creation, by the projection of a system of drainage, which, whether considered in a sanitary or other point of view, remains unrivalled at the present day; and which, of all their grandest works, forms perhaps the most prominent monument of their

* Deuteronomy xxiii, 12 and 13.

† Herodotus, book ii.

refinement and civilisation. The drainage of Rome, which is well described by Pliny,* consisted of a system of sewers (cloacæ), which received the surface water and dirt of the streets, as well as the ordure† from the houses of the whole city; the communications between the houses and sewers being effected by earthen or wooden pipes. These sewers opened into one main (cloaca maxima), which was fifteen feet wide and thirty feet high, and was navigable by boats.‡ Some portions of it are still in existence. The most remarkable feature, however, of the system, and which is most instructive, is the abundant supply of water with which it was furnished, as evidenced by the large number of aqueducts, the universal use of the bath, the numerous public and private fountains, fishponds, and artificial lakes, and the seven streams§ which fed the main sewer, the rapidity of whose current equalled that of the Tiber, into which it flowed.

We look in vain for any such efficient system in modern times. The drainage of London most resembles it, but is, as will be seen on examination, defective in the very element which essentially gave to the drainage of Rome its excellence—an abundant and *continuous* flow of water.

The removal of the ordure of this metropolis has hitherto been effected partly by horse and cart, assisted by manual labour, and partly by waterflow. The former, inasmuch as it was most offensive in itself, and involved the use of cesspools, thereby giving rise to all those evils which it is necessary to avoid, has been most wisely interdicted. The latter remains in the form of the present drainage, which, as regards its extent in connexion with its results, is remarkable not only for its inefficiency but for the production of much mischief. The cause of this inefficiency arises not from any defect in the principles upon which it is based, but on account of the inefficiency of its most essential element—the vehicle, the motive power, the water—which takes the place of that labour which man, in his primitive state, must perform, and for the lessening of which drainage was invented by him. In consequence of this defect, all those matters—the dilution of, and immediate and inoffensive removal of which it is intended to effect—are arrested, accumulate, and, suffering decomposition, give off those noxious gases, which it is the custom to confine and concentrate by "trapping" and other mechanical contrivances;

* Pliny, Opus omnium Maximum, etc., lib. xxxvi, cap. xv.
† Ulpianus (Domitius).
‡ Dion Cassius.
§ On the accession of Augustus, Marcus Agrippa restored the sewers, then out of repair, and caused seven streams to flow into the main sewer. Dionysius Halicarnassus.

but which, by the laws of gaseous diffusion, somewhere or other find an exit, and there exert their morbific influences. This great defect has illustrative proof in the fact that the sewers have to be periodically relieved of their accumulations by large flushings of water, at great expense and great injury to them, and ultimately by manual labour—a practice which every medical officer of health will confirm me in stating to be morally and physically wrong, as repugnant to human nature, injurious to health, and sometimes destructive to life.*

A consideration of the foregoing data and evidence adduced leads to the conclusion that the present drainage, although possessing neither uniformity, regularity, nor efficiency, and although an extension of it in its present defective state (as contemplated by the engineer of the Metropolitan Board of Works) would but multiply its existing evils in proportion to such extension, nevertheless contains the principles of that system which it would be most desirable to pursue to its ultimate perfection; for there is ample experience to prove that the most simple, convenient, and inoffensive, as well as economical and efficient means which could be possibly devised for the accomplishment of the object of drainage, is afforded by a flow of water by gravitation, which serves at once for the dilution of offensive liquids, the absorption of gases, as the vehicle of the solid matters, and as the motive power for the removal of the whole. But this perfection can only be ensured by making provision for a continuous flow of water throughout the whole system, beginning at its periphery, consequently from each house. This supply of water should be independent of rain, the refuse of that used for domestic purposes, or any other accidental sources; it should be entirely removed from the control, and consequently from the carelessness or neglect of individual members of the community; it should be furnished in such quantity as to keep the sewers as full as practicable, in order to ensure the prevention of the accumulation of gases which may occur in sparingly filled sewers, and the absorption of any as soon as formed, by continuous fresh volumes of water, and also to diminish that great amount of wear and tear which arises from forcible and interrupted flushings. The sewers should be impermeable by liquids or gaseous fluids; and it may be assumed that very much smaller ones than those now in use might be advantageously employed if the rapidity of re-

* Many instances have occurred of the death of men engaged in this disgusting labour. In 1849, a party of men, and a medical gentleman (Mr. Wells) who went to their assistance, lost their lives in the Warwick Street sewer. Much sickness has also resulted from such occupation, of which the public are mostly unaware.

moval, which a continuous flow of water would ensure, be taken into account. It would be matter for serious consideration how this large supply of water is to be furnished, whether by the Thames and its tributary rivers, by artesian borings, or by the construction of reservoirs of sufficient size capable of being filled at high water, or by all of these. The last mentioned would appear to be sufficiently practicable, except for those portions of the metropolis whose elevation is too great. But in the absence of these, and inasmuch as reasonable fears have been entertained that the removal of so large a body of water as that now required from the Thames and its tributaries will before long become injurious to the natural constitution of the river, and seeing that such removal is rapidly increasing, the proposition of bringing by aqueduct from the sea an unlimited supply is so reasonable and practicable that it should be at once embraced. Such a supply of salt water would at once serve for the purposes of drainage, street washings, public and private baths, fountains, and lakes; and, in short, for very many other purposes for which filtered river water is now employed; while it would be the means (and this is most important) of causing an immense saving in the expenditure of that vital necessity the drinking-water of the people, and correspondingly diminished withdrawal from the Thames and its tributary streams. To these advantages may be added that which such a supply would possess in the extinction of accidental fire. This proposition has been objected to on the score of the increased expense which it would entail. It will be found on examination, however, to contain a vast economy. It has been confidently stated that such a supply could be furnished at the low rate of one penny in the pound upon all rentals. The present water rate is about ten times this amount. The difference between the two rates, relative to the amount of filtered river water which would be superseded by salt water, would be the amount saved upon the whole water rate.

With reference to the point of the outlet of the sewerage, numerous propositions have been made, according to the various intentions entertained as to the ultimate utilisation or loss of the sewerage. In dealing with this very important part of the subject, it is necessary to remember that as the object of drainage is simply, and without any modification, a purely sanitary one, so the means for the accomplishment of that object should not be hampered or interfered with by any abstract theory or plan of a secondary nature; that, however desirable it may be to conjoin with it a means of restoring the sewerage of the town to the fields from whence it originally

came, that the town may derive a pecuniary benefit by the transaction; this should not be tried unless it can be done without the least obstruction to, or interference with, the primary object in view, which is not a financial but a sanitary one.

The most practicable of the above propositions are—1. To convey the sewerage to certain works for the purpose of deodorising it, and converting it into manure. 2. To convey it immediately to the fields, for the purpose of manuring them by irrigation. 3. To convey it to the sea. This would include the proposition to carry it so far down the river as to prevent the possibility of reflux, which would be virtually taking it to the sea.

1. In examining the various plans of deodorisation which have been brought forward, the first great objection which presents itself, and which appears insuperable (premising that drainage by water flow is the only one from which efficiency can be anticipated), is the obstructiveness to the object of drainage which they contain; for it is admitted that the value of town ordure for manufacturing manure by deodorisation is diminished in proportion to the amount of water with which it is diluted —a fact which is in opposition to the drainage by waterflow.

Passing by this objection, let us inquire what conditions chemistry is required to fulfil, and whether that science has the power to fulfil them. Sanitary considerations demand that the sewerage shall not only be deodorised but disinfected also, which is another and very different thing; for infection may exist, although inappreciable to the senses. Deodorisation and disinfection have been so confounded by writers, even of the present day, that these terms are frequently used synonymously; their action has also been equally confused. Deodorisation, which represents the power of destroying offensive odours, and of arresting the putrefactive process, may be readily effected by many chemical agents, particularly the alkaline chlorides; but there is no evidence to shew that any such substances have the power of destroying those newly formed products of putrefaction which are presumed to be either the direct or indirect, the active or passive agents in the propagation and promotion of disease. On the contrary, there is much incontroverted evidence from experiments to prove the reverse. Thus: vaccine lymph is found to succeed, when mixed with an equal quantity of solution of chloride of soda. Chlorine was employed some years ago at the Small-pox Hospital for the arrest of erysipelas; all offensive smell was suppressed, but not so the extension of the disease. During the cholera at Moscow it was found that, at the time when the Cholera Hospital was filled with clouds of chlorine, then it was that the greatest

number of attendants were attacked. In fact, the only real disinfectant known is heat.*

With all due recognition of the great and increasing powers of chemistry, I cannot help expressing my conviction that, at the present time, that science is not sufficiently advanced to undertake the fulfilment of such conditions as sanitary science demands in any proposed works of deodorisation.

2. By the plan of irrigation, the greatest financial return would be undoubtedly realised. It would also appear to be supported by the solution of a natural problem—the direct restoration of that fertility to the soil of which it has been deprived by cultivation, thus completing the link in the true physiological circle between the animal and vegetable kingdoms. But it is a matter for grave consideration whether the constant exposure of so large a body of offensive matter† over so large a surface as it must occupy, would not develope far greater evils than the partial, or even the entire loss of value which would accrue from the plan of carrying it to the sea.

3. Carrying ordure to the sea, it is generally thought, would be tantamount to throwing it away. There is good reason, however, for believing that, in a financial point of view, it is not lost at the present time; for the fishermen say that it is returned to the alderman's table in the form of fat wholesome fish. It is a certainty that fish congregate at the mouths of rivers (which cannot, at the mouth of the Thames, be to obtain fresh water as imagined), and it is reasonably supposed that the *debris* of organic tissues present in the sewerage furnish a great amount of the food of fish found on inhabited coasts. This consideration would be more important and noticeable, should Government pay that attention to its fisheries which is found to yield so abundant a return in America and elsewhere.

Loss of life and loss of sewerage attend the present and the proposed systems; but let the only available means be adopted, viz., an abundant and continuous water-flow, for the dilution and immediate removal of all sewerage, and the greater of these losses will be as immediately prevented. Until chemistry, which now appears inclined to lend herself to the sewerage market, shall be able to step in, and, assuming an unmistakeable position, save by her appliances both life and sewerage, it is evident that either the sewerage must be economised at the cost of health and life, or health and life must be preserved at the expense of the sewerage. Of these two evils shall we not choose the lesser?

* In a pamphlet on the Drainage and Sewerage of London, etc., by Dr. Copland, this, the most important question in reference to works of deodorisation, is summarily disposed of by means of a little chloride of lime. (p. 24.)

† The daily amount of the excreta of London exceeds 1100 tons.

SANITARY AND SOCIAL SCIENCE.

REPORTS ON CITIES, TOWNS, & DISTRICTS.

THE SANITARY CONDITION OF HUDDERSFIELD.

HUDDERSFIELD, one of the principal seats of the woollen manufacture, is situated in the West Riding of Yorkshire, 24 miles north-east of Manchester, and 189 miles north-north-west of London. This town may be considered as the centre of a highly populous and flourishing neighbourhood, comprising as it does within a radius of six miles in circumference, a population considerably exceeding 100,000 persons, and being located within easy distances of the great towns of Leeds, Bradford, Halifax, Sheffield, and Wakefield. The town itself stands on a plain, on the banks of the river Colne, for the most part declining from the north-west to the east, but also declining to the river on the south, and to the Hill House Valley on the north; these large slopes afford great natural facilities for removing the town's drainage. The height above the sea, at the river to the east, is 200 feet; to the north-west, near Edgerton, 446 feet; to the south, at Longroyd Bridge, on the Colne, 260 feet; and to the Hill House Valley, near Bayhall, 250 feet. Castle Hill frowns over the town at a short distance to the south, at a height of 900 feet above the sea level; to the north-east, the Whitley Hall and Grange Moor range of hills attain the height of 775 feet; the intervening hills of Almondbury Bank and Kilner Bank are respectively, at their summit level, the former 500 feet, the latter 400 feet; to the north-by-west of the town, the Ainley and Fixby ridge varies from 693 feet to 850 feet above the sea level, and this range of hills is remarkable for its treasure of the finest grey slates and flag stones; whilst to the south-west, the altitude of the hills varies from 600 to 1,000 feet; these elevated ranges form a part of that remarkable chain of mountains, called the back bone of Yorkshire, situate between Blackstone Edge and Standage.

GEOLOGICAL FEATURES. It cannot fail to strike the beholder that our town is situated where once great convulsions have taken place. We have evidence of this in the strata upon which the town is chiefly built; for, after removing the alluvial soil on the surface, we find beds of sand and clay containing large pieces of argillaceous sandstone, brought from a distance,

sometimes in groups and sometimes disseminated amongst the clay, some of them evidently waterworn. We also meet with boulders of a rock, locally termed "Ganister," also brought from a distance and waterworn; abundance of them are found at Hill House, buried in the clay: they are of great specific gravity, and contain beautiful specimens of fossil plants, but so crushed and intermingled together that it is difficult to assign them to any known species of the fossil flora. There is sufficient reason for believing that the clay has been produced from the disintegration of the sandstone rock of the millstone grit series of our western moorlands, and that in the progress of the denudation of our moorland valley, it has been swept down from higher ground, and deposed on its present site, along with fragments torn from the rocks, and large boulders of "Ganister" from the parent rock in the Marsden Valley, and far away from their present resting place. In our field walls these large irregular boulders, hard as iron, and indestructible as granite, are often seen; they can be referred to no neighbouring quarry, and yet, perhaps, there are but few that think of the place from which they came, or of the velocity of the mighty wave of water that must have brought them here!

There is a rock of some thickness of argillaceous sandstone of smooth plain surface, which caps the high ridges of the hills to the eastward of this place; under it, alternating with beds of shale and banks of sandstone, lie the best seams of coal of the Yorkshire series. These beds of rich bituminous coal lie conformably with the rock that covers them, and therefore "crop" out, as the miners say, on the western sides of the hills, and disappear. The rock is found to take an irregular course from Derbyshire, Sheffield, Penistone, Whittey Hall, Grange Moor, and neighbouring hills, Elland Edge, and Clayton Heights. Passing Idle and Chapel Allerton, it returns parallel with the river Aire, to the magnesian limestone.

The town of Huddersfield is chiefly supplied with coal from Grange Moor and Flockton, a few miles distant; for the more valuable beds run out and disappear on the western side of the Whittey Hall and Grange Moor ridge of hills. We have, however, several lower beds of the series in the neighbourhood, but of less thickness and value than those of the upper part of the series. The different layers of coals appear to be characterised by a somewhat distinct flora. The upper beds, more particularly, contain beautiful specimens of tropical plants, calamites, lepidodendrons, etc.; and from the lower beds, worked in Grimescar wood, some of the finest specimens of

ammonites have been seen, converted into iron pyrites, and being in appearance like gold. One of the lower beds of coal is worked at Steel Common, and fine fossil specimens of organic remains are frequently discovered. These lower beds, rising towards the moor lands to the west of Huddersfield and Halifax, soon run out and disappear almost entirely. The millstone grit rock, with its series of sandstone rocks and shales, appear and cover the moorlands through a large district of country. In this rock coal seldom appears, except in thin bands, which are supposed to have no connection with the general coal field. The chief member of the millstone grit series is a conglomerate rock, and forms the crags of our chief moorland eminences. It consists of fine large pebbles of quartz, water worn, and cemented within a mass of granular silicious particles, by the intervention of oxide of iron. We have specimens of it at Mytholm Bridge, Netherton, Quarmby, Halifax, and Harrogate. But its chief accompaniment is one of the finest siliceous grit stones containing magnesia; witness the beautiful—almost palatial—structures now rising in Huddersfield and Dewsbury.

This beautiful freestone is quarried at Marsh and Quarmby Edge, above this town. It is imperishable, and thoroughly impervious to moisture; and will ultimately render Huddersfield one of the finest towns in the kingdom. We must not forget to notice another rock, higher in the series; the fine slates and flagstones of Elland Edge, which have obtained, and most justly so, a wide reputation.

WATER SUPPLY. The qualities of the indispensable agent, water, must necessarily partake of the nature of the inferior beds or strata through which it has to percolate; and its purity will for the most part be in the indirect ratio of their solubility, with the exception of certain substances derived from another source, in the following manner. Rain water, descending upon and entering the ground, contains a notable quantity of carbonic acid and ammonia. The ammonia will be retained by the surface soil as a manurial agent; the freed carbonic acid will combine with the carbonate of lime and render it soluble, as also with the magnesia and protoxide of iron; part of these salts in solution may be required in vegetation, the remainder may be rejected as useless, and pass away in the water to the inferior strata.

But the chlorides of calcium and sodium are also always present in soils under cultivation. They are derived from the manure applied to the land for that purpose; and every particle of the manurial elements is firmly retained in the soil, while

the chlorides for the most part are rejected, and not being necessary to vegetation, are likewise by descending rain removed from the soil and carried down to the inferior strata, and there accumulating, this water forms springs and streams for the future use of man. Hence it is that we find the purest spring water never entirely free from these mineral impregnations, as well as other ingredients, dissolved from the different strata it has had to traverse in its passage downwards. The quantities of these ingredients vary greatly: to the westward of Huddersfield the rocks are nearly insoluble; and, as our water is collected over a large area of the millstone grit series, it contains few ingredients except those, as before described, which must of necessity be present. The reservoirs for supplying the town are situated at a high level near Longwood; and the supply is very considerable from the natural springs which gush out from beneath the millstone grit rock. To increase that supply, several artesian wells have been bored to a considerable depth, which probably has not improved the purity of the water. This Longwood water was analysed some time ago by Mr. Marriott. The quantity of solid matter was inconsiderable, consisting principally of carbonate and sulphate of lime, and a trace of oxide of iron. The water of the Royleshead springs contained $2\frac{1}{2}$ grains of solid matter in the gallon; of Bunney Clough, $1\frac{3}{4}$ grains; and of Cloughead $6\frac{1}{2}$ grains. The latter contains some alumina; and all the samples contain a trace of chlorides and organic matter.

The supply of this excellent water to the township, and a few hundred tenements beyond, has been since last October 700,000 gallons per day. The average daily supply, throughout the year, is underrated at 450,000 gallons; which, distributed amongst 6,200 tenements, is in the proportion of 72 gallons to each, or between 13 and 14 gallons to each individual. This ample supply could very easily be enlarged, should the necessities of the town require it; for, at the present time, the waste during periods of overflux would be amply sufficient to fill another reservoir.

But to the south and east of this town the case is different. The descending rain has to pass through almost innumerable beds of shale (particularly to the eastward) bands of stonebind, soluble partly in acid, nodules of iron, and iron pyrites; and, on making its appearance as spring water, it is found in many cases of a very indifferent quality.

There is a very curious circumstance in connexion with the artesian wells of this neighbourhood. On penetrating beneath the fireclay and micaceous sandstone, a strongly alkaline water

is obtained. In the valley to the south of Almondbury, at Rushfield, 375 feet above the sea level, this water was obtained at a distance of fifty-five yards from the surface; on penetrating the micaceous sandstone, this water rose to a height of forty-eight yards. At a distance of one hundred and fifty yards from the above-mentioned well, another was sunk, and this water was reached eighteen yards from the surface. On the south side of Castle Hill, in the same valley, 600 feet above the sea level, the same strongly alkaline water was reached at a depth of twenty-eight yards; it rose to within six yards of the surface. The Messrs. Brooke, of Armitage Bridge, and Mr. Atkinson, of Bradley Mills, have likewise bored, and found the same description of water, which has been analysed by Mr. Jarmaine, of Almondbury, and found to contain the carbonates of iron, lime and magnesia, silicate of soda, sulphate of soda, chloride of sodium, carbonate of manganese, and carbonate of soda, the latter in very considerable quantity.

The strong alkalinity appears to be due to the presence of the carbonate of soda. It is difficult to conclude otherwise than that these remarkable waters have a common origin. The places where they are found lie several miles apart, and at very different levels; and if we admit that there is a natron lake in the bowels of the earth, whose waters exist under great pressure, still there are some circumstances in the case which appear difficult to explain.

The strata pierced through at Rushfield were as follows:—

ft.		yrds.	ft.	in.	
1	Alluvial soil	0	1	5	Galliard—very hard.
3	Alluvial clay	5	0	7	Stone bind.
15	Brown shale	20	1	6	Black shale.
21	Blue shale	1	2	0	Fire clay.
35	Black shale				
4	Stone bind.....	1	2	2	Micaceous sandstone.
		55	2	8	

The river Colne washes the southern and eastern skirts of the town, and flows northward to the Calder; it has suffered greatly from the intrusion of coal-pit water from the neighbourhood of Honley and other places, and is now loaded with sulphate of iron and other impurities. The proximity of a river should be conducive to the health and well being of a town's population, affording the opportunity for bathing, swimming, boating, and other pastimes of a pleasurable and salutary character, besides affording facilities for proper drainage.

But neither do our canal nor river serve any of these purposes, excepting the latter; the streams are so dingy and dirty that they are unfitted for purposes of cleanliness; instead of being

the favourite promenade, the pedestrian who values his health avoids their banks, on account of their noxious exhalations, especially in the summer. The fish (their natural tenants) have departed, and their place is supplied by water rats, and those classes of small insects which defy, and seem to fatten on, putrescence.

INCREASE OF POPULATION. The population of Huddersfield has more than quadrupled itself during the last half century; in 1801 it numbered 7,268 persons, in 1851, 30,880. The average rate of increase of the whole British population is 1.3 per cent. annually; of manufacturing towns in Great Britain, 2.38 per cent.; whereas the increase of Huddersfield is considerably above 6 per cent. At the census in 1851, there were 5,739 inhabited houses, shewing an average of 5¼ persons to each house in Huddersfield; the average of the whole of Britain was 5.7.

PAUPERISM. The amount of pauperism in Huddersfield is considerably below that shewn by an average of England and Wales. At the time of the census, 126,488 paupers were inmates of workhouses in England and Wales, being in the proportion of one indoor pauper to every 142 inhabitants, or seven in every 1000. In the half year ending September 29th, 1856, the total number belonging to this township receiving in-door relief was 211, being one in every 146 inhabitants, or seven in the 1000, not for one particular day, but for the whole half year. The total number receiving out-door relief pertaining to the township during the same period was 1,912; the number of lunatics chargeable to the township was 25, of which eight were in workhouses, and 17 either in asylums or receiving out relief. There are five workhouses belonging to the Huddersfield union, one of which is situated within the township. The number of paupers contained in this Huddersfield poor-house, on the average of 1854-55, was 330 per year; amongst these there were about 35 or 36 lunatics or idiots. The deaths in this institution average 45 in the year, or 14 per cent. of all admitted; whilst, taking an average of ten London workhouses, the mortality ranges as high as 20 per cent. Of the sexes, the males considerably predominate; and amongst the causes which attract to the workhouse, we find intemperance to be the most fertile in them, and prostitution in the female. This poor-house is a very inconvenient and badly-arranged building. Institutions like workhouses, where all the occupants are under direct control, should be model institutions; the inmates should especially be carefully classified; but in this one we find prostitutes mixing with the virtuous poor, and even with

the children, and no distinctions between the idiots and the sane, the youthful and the aged. The sick wards and appurtenances are miserably contrived, and as an asylum for idiots or lunatics it is utterly unfitted; indeed, the proper places for these poor creatures are undoubtedly our County Lunatic Asylums, for in no poor-house is there the requisite organisation to admit of their receiving that attention which ought to be paid to mental diseases. If some of the workhouses of this union were united in a central and well-appointed building, and furnished with a thoroughly well-organised staff, I believe the comfort of the inmates would be materially increased, the claimants for admission uninjured, and the ratepayers in the long run relieved.

A suggestion has been made which seems deserving of a trial, viz., that amongst the females receiving relief, an attempt should be made to qualify some of them for the office of nurses to the sick poor who might require them, or those in better circumstances able to remunerate. No doubt many lives are lost among the poorer classes, and families for years made chargeable to the parish, for want of proper nursing in a serious illness; nor does it seem improbable that there may be many females now depending on the parish, who would be able to achieve their independence, and become useful members of society, if encouraged and stimulated by opportunity, discipline, and example.

(*To be continued.*)

MISCELLANEA.

EDIBLE SEAWEEDS.

It is well known that on different parts of our coasts certain seaweeds are employed by the inhabitants as articles of diet. Some, as the laver (*porphyra laciniata*), is considered so great a delicacy by Devonshire people, that it finds its way even to the *marchands de comestibles* of Bond Street and Piccadilly. Dr. John Davy has recently, in conjunction with Dr. Apjohn,* investigated the properties of some seaweeds. The results at which these inquirers have arrived are deserving of attention, and should be generally known. Their experiments have been directed to determining the esculent properties of carrigeen moss (*chondrus crispus*), dulse or dylisk (*rhodomenia palmata*), laver

* See the Edinburgh New Philosophical Journal, July 1856.

(*porphyra laciniata*), tangle (*laminaria digitata*), and bladder-wrack (*fucus vesiculosus*).

The following is a brief summary of the conclusions arrived at by Dr. Davy :—

The algæ mentioned contain no starch, sugar, or oily matter. Chondrus crispus contains a large amount of gummy and gelatinous matter ; as does also the rhodomenia palmata, and the porphyra laciniata. Very little gum, and no gelatine, were discovered in the laminaria digitata ; and only a trace of gelatinous matter appears to have been obtained from the bladderwrack. All contain more or less iodine, which is removed by maceration or bleaching. In one instance, Dr. Davy observes, the seaweed was deprived (by washing) not only of adhering saline matter, but also of a portion of its own substance, and of the iodine entering into the composition of the algæ, thereby necessarily deteriorating its value. This remark is specially applicable to chondrus crispus, which is largely exported from Ireland in a bleached state. Even the nitrogenous constituents appear to be diminished by the bleaching process. The point of chief interest, however, is the demonstration afforded by Dr. Apjohn, of the large amount of nitrogen contained in some seaweeds, which justifies the reputation they have amongst the poor, to whom their use as an article of food is chiefly restricted. The following is a tabulated account of Dr. Apjohn's experiments :—

Account of Dr. Apjohn's Experiments.

	Water.	Dry Matter.	Per cent. of Nitrogen in Dry Matter.	Protein contained in Dry Matter.
Chondrus crispus, bleached	17·92	82·08	1·534	9·587
„ *crispus*, unbleached	21·47	78·53	2·142	13·387
Gigartina mammillosa	21·55	78·45	2·198	13·737
Chondrus crispus, bleached	19·79	80·21	1·485	9·281
„ *crispus*, unbleached	19·96	80·04	2·510	15·687
Laminaria digitata, or Dulse Tangle	21·38	78·62	1·588	9·925
„ *digitata*, or Black Tangle	31·05	68·95	1·396	8·725
Rhodomenia palmata, or Dylisk ...	16·56	83·44	3·465	21·656
Porphyra laciniata, or Laver	17·41	82·59	4·650	29·062
Iridæa edulis	19·61	80·39	3·088	19·300
Alaria esculenta, or Murlins	17·91	82·09	2·424	15·150
Means	20·42	79·58	2·407	15·045

The percentage of nitrogen found in various other edible substances is given by way of comparison, thus :—

	N.
Potatoes, contain	·541
Flour of first quality	1·817
Beet roots (Mean of 13 experiments) . .	1·848
Mangolds (Mean of 3 experiments) . . .	1·781
Swedish turnips (Mean of 5 experiments) . .	1·843
Means . . .	1·567

It follows from these two series that the proportion of nitrogen contained in these algæ exceeds not only that of the ordinary articles of vegetable food, but even that of wheaten flour, being as 2·407 to 1·817.

Dr. Davy suggests, further, that the iodine and bromine contained in these esculent seaweeds render them worthy of more extended use; he states that where they are commonly employed, bronchocele is unknown, and scrofulous complaints and pulmonary consumption are rare. Apart from their culinary importance, seaweeds are in great repute as manures, wherever they are easily obtained. This is accounted for by their wealth in nitrogen, and in those inorganic substances which are essential to our cereals, especially phosphate and carbonate of lime, and one or both of the fixed alkalies. In the economy of nature, these marine plants may be regarded as exercising no less important a part than terrestrial plants. "May they not," says Dr. Davy, "be considered as purifiers of sea-water, tending always to remove excess of carbonic acid, and probably of azote? and may they not be viewed as the restorers (they certainly are the collectors) of substances possessing excellent medicinal qualities, viz., iodine and bromine, which so specially belong to them, and, in them, seem providentially saved and stored up for the use of man."

We cannot but regard this inquiry as one fraught with much interest of a scientific and a practical character. We are, therefore, much gratified to learn that two prizes of £50 and £20 respectively are now offered for the best approved essays on the application of the marine algæ and their products, as food or medicine for man and domestic animals (cattle, sheep, etc.) Competitors are required to give the results of their original investigations on seaweeds, especially on the chemistry of their nutrient principles, and must therefore prepare a series of specimens, illustrative of the best mode of collecting, preserving, and transporting, in a state fit for food, the nutritive species. It is proposed that the prizes shall be awarded by the following gentlemen:—T. C. Archer, Esq., Liverpool; Professor Balfour, Edinburgh; Dr. John Davy, Ambleside; Professor Graham, Royal Mint, London; Dr. Greville, Edinburgh;

Sir W. J. Hooker, Kew; Dr. Lindsay, Perth; Sir W. C. Trevelyan, Bart., Wallington; and Professor George Wilson, Edinburgh.

SANITARY IMPROVEMENTS IN THE MANUFACTURE OF CHEMICALS.

M. KUHLMANN, who has many large manufactories of artificial soda at Amiens and elsewhere, has completed a system for condensing acid vapours (chiefly hydrochloric), by making the condensation of the acid vapour the basis of a manufacture of salts of barium. He places, after the ordinary condensation apparatus, earthen vessels containing native carbonate of baryta in masses, moistened with water. After passing five or six of these vessels, the whole of the hydrochloric acid uncondensed by the first or ordinary process of subjecting them, with an excess of steam, to a gradual cooling before entering the chimney, is held in solution as chloride of barium. To complete this process in the Amiens factory, he makes the vapours passing from the baryta vessels go through a large earthenware cylinder, having within it a wheel with flat arms. As this plays round, it makes the vapours traverse a solution of carbonate of baryta, which descends in the form of a fine rain. By a further very simple process, M. Kuhlmann forms from the chloride of barium artificial sulphate of baryta, and reproduces the hydrochloric acid in a free state.

Kuhlmann has also applied a system of condensation to the chemical products of the manufacture of lamp-black. The vapours, consisting of the ammonia mixed with the burnt air of the furnaces, are driven into a stone trough containing an iron mill with wings. This is covered by a semi-cylinder of metal. As the vapours pass through the cylinder, the mill throws out a shower of fine drops of solution of chloride of manganese, the residue of the manufacture of chlorine. All the ammonia is thus condensed into the muriate. The liquid condensed consists of carbonate and sulphuret of manganese and coal soot; it is easily used in making sal ammoniac, and can be applied to the manufacture of artificial manures. This plan diminishes the smoke of the furnaces; but the author has not found that the quantity of ammonia condensed is sufficient to repay the expense; mechanical power may therefore have to be employed to facilitate the chemical action of bodies which react on each other. (*Journal de Pharmacie et de Chimie*, November, 1856.)

DETECTION OF ERGOTISED RYE.

To detect ergotised grains in corn, M. Payen gives the following instructions:—The ears affected are distinguishable by many of the grains in it being replaced by a violet-brown substance, almost black, of larger volume and frequently twisted, brittle, having a grey mass inside. The ergot may be distinguished even when no larger than the healthy grain, or when broken into several pieces, not only by its external dark colour, but also by its lightness; it floats on water, whereas the healthy grains sink to the bottom.

One-eighth to one-tenth per cent. of ergot in bread may cause gangrene and loss of the limbs, and the poisonous effect is more powerful on animals than on man. In poultry, the phalanges fall off; even the beak is detached. In pigs, the nails fall off, and the animal dies.

The dangers of ergot may be avoided by properly cleansing the grain, by the hand, by sifting, or by fanning. These various processes would be inexpensive, as the ergot would produce profit, sold for medicinal purposes. (*Journal de Chimie Médicale*, Dec. 1856, and *Chemist*, Jan. 1857.)

PAUPERISM IN ENGLAND IN 1857.

THE number of paupers of all classes in England and Wales, in receipt of relief, on the 1st of January, 1857, was 843,430; the whole population, according to the census of 1851, being 16,530,262. The poor thus relieved were distributed through 624 unions, and 14,169 parishes. After deducting increase, the total relieved leaves a decrease of 33,225 relieved on the same date in the year 1856, *i.e.*, a decrease of 3·8 per cent., and affords a proportion of all classes relieved of 5·1 per cent. to the whole population. Of the classes thus relieved, 139,130, or 16·5 per cent., rank as able bodied paupers, yielding a decrease of 13,034, or 8·6 per cent., from the year preceding. Of these able bodied persons, 22,368 received in-door, and 116,762 (amongst whom 50,362 were widows) out-door relief. This calculation does not include places under "Gilbert's Act," under "local Acts," and the parishes under "Elizabeth's Act." In these there are collectively comprised 435 parishes, and a population of 1,371,409, regarding which no particulars are supplied. (*Government Return, February*, 1857.)

PROGRESS OF EPIDEMICS.

LOCAL REPORTS OF EPIDEMIC AND ENDEMIC DISEASES

During the Months of December, January, and February, 1856-57.

Place.	County.	Lat.	Long.	Observer.
St. Mary, Scilly	Cornwall -	49.50 N.	6.18 W.	J. G. Moyle, Esq.
Teignmouth -	Devonshire -	50.32 N.	3.29 W.	W. C. Lake, Esq.
Canterbury -	Kent - -	51.17 N.	1. 4 E.	G. Rigden, Esq.
Chatham -	Kent - -	51.21 N.	0.14 E.	F. J. Brown, M.D.
Wandsworth -	Surrey - -	51.28 N.	0. 7 W.	G. E. Nicholas, Esq.
Putney - -	Surrey - -	51.28 N.	0. 8 W.	R. H. Whiteman, Esq.
Up. Holloway	Middlesex -	51.32 N.	0.03 E.	W. B. Kesteven, Esq.
Wanstead -	Essex - -	51.32 N.	0. 2 W.	F. Collins, M.D.
Swansea -	Glamorgansh.	51.38 N.	3.50 W.	W. H. Michael, Esq.
Aspley Guise -	Bedfordshire -	52. 1 N.	0.37 W.	J. Williams, M.D.
Saffron Walden	Essex - -	52. 3 N.	0.12 E.	T. Spurgin, Esq. H. Stear, Esq.
Bedford - -	Bedfordshire -	52. 8 N.	0.51 W.	T. H. Barker, M.D.
Sharnbrook -	Bedfordshire -	52.12 N.	0.40 W.	R. S. Stedman, Esq.
Newpt. Pagnell	Buckinghams.	52.10 N.	0.42 W.	G. O. Rogers, Esq.
Wellingbro' -	Northamptons.	52.20 N.	0.40 W.	B. Dulley, Esq.
Stourbridge -	Worcestersh. -	52.28 N.	2.32 W.	A. Freer, Esq.
Beccles - -	Suffolk - -	52.25 N.	1.48 E.	W. E. Crowfoot, Esq.
Thetford -	Norfolk - -	52.26 N.	0.45 E.	H. W. Bailey, Esq.
Dudley - -	Staffordshire -	52.30 N.	2.10 W.	J. H. Houghton, Esq.
Barrowden -	Rutland -	52.34 N.	0.38 W.	H. J. Swann, Esq.
Wisbeach - -	Cambridgesh.	52.39 N.	0. 5 E.	W. H. Hole, Esq.
East Dereham	Norfolk - -	52.40 N.	0.57 E.	J. Vincent, M.D.
Pontesbury -	Shropshire -	52.43 N.	2.50 W.	Wm. Eddowes, Esq.
Nottingham -	Nottinghamsh.	52.50 N.	1.10 W.	T. Robertson, M.D.
Burton-on-Trt.	Staffordshire -	52.53 N.	1.53 W.	S. Thomson, M.D.
Oswestry -	Shropshire -	52.53 N.	2.59 W.	P. Cartwright, Esq.
Wrexham -	Denbighshire -	53. 2 N.	3. 1 W.	E. Williams, M.D.
Hawarden -	Flintshire -	53.11 N.	3. 2 W.	T. Moffat, M.D.
Lincoln -	Lincolnshire -	53.12 N.	0. 5 W.	S. Lowe, Esq.
Alford - -	Lincolnshire -	53.15 N.	0. 6 E.	R. U. West, M.D.
Staveley -	Derbyshire -	53.15 N.	1.20 W.	G. B. Thorpe, Esq.
Gainsborough	Lincolnshire -	53.23 N.	0.47 W.	D. Mackinder, M.D.
Liverpool -	Lancashire -	53.24 N.	2.59 W.	Thos. Bickerton, Esq.
Warrington -	Lancashire -	53.25 N.	2.32 W.	C. N. Spinks, Esq.
Bolton - -	Lancashire -	53.35 N.	2.19 W.	W. H. Pendlebury, Esq.
York - -	Yorkshire -	53.58 N.	1. 3 W.	W. Procter, Esq.
Wst. Auckland	Durham -	54.45 N.	1.40 W.	G. Todd, Esq.
Rothbury -	Northumberld.	55.25 N.	1.50 W.	E. C. Summers, Esq.
Lerwick -	Shetland Isles	60. 9 N.	1. 8 W.	G. W. Spence, M.D.

QUARTERLY STATEMENT—No. IX.

[*The dates denote that the disease appeared in the weeks then ending.*]

SCARLET FEVER.

Teignmouth..December 5
Canterbury..All Dec. and Jan.
Chatham..December 12
Wandsworth..All Dec., Jan. 2, 30, Feb.
Putney..December 5-12 [20-27
Upper Holloway..Jan. 9-30, Feb. 6
Swansea..December 5, 26
Aspley Guise..Dec. 5, 19, Jan. 9
Saffron Walden..January 30
Sharnbrook..December 5 [Feb. 6
Newport Pagnell..Dec. 19, Jan. 16-30,

Stourbridge..Jan. 30, Feb. 6
Beccles..December 5-12
Dudley..Jan. 2, 9, 23, 30, Feb. 13-27
Barrowden..Dec. 19, Feb. 13-20
East Dereham..All Dec., Jan. 2-23
Pontesbury..Every week
Alford..January 9-16
Gainsborough..All Jan. and Feb.
Liverpool..Every week [6, 13, 27
Warrington..Dec. 5-26, Jan. 2, 30, Feb.
Bolton-le-Moors..Dec. 5-19, Jan. 2, 9,
West Auckland..All Jan. & Feb. [23

MEASLES.

Teignmouth..December 5-12
Canterbury..January 16-23
Chatham..December 5
Wandsworth..Jan. 2, 9, 23, 30, Feb. 13
Putney..February 20
Upper Holloway..All Dec., Jan. 2, all
Wanstead..Jan. 9-30, all Feb. [Feb.
Saffron Walden..Jan. 9, all Feb.
Bedford..Every week
Thetford..December 19
Wisbeach..All December & January
Pontesbury..Every week
Burton-on-Trent..December 5-12
Wrexham..December 19-26
Lincoln..All Jan., Feb. 6-13
Alford..Dec. 26, all Jan. and Feb.
Gainsborough..February 13-27
Liverpool..Every week
Warrington..Jan. 30, Feb. 6-20 [Feb.
Bolton-le Moors..Dec. 12-19, all Jan. &
York..Dec. 12-19, Jan. 2, 16, all Feb.
West Auckland..All December

SMALL POX.

Chatham..December 5, 26
Stourbridge..February 13-20
Dudley..All Dec. and Jan., Feb. 6, 20
Wisbeach..February 20-27
East Dereham..February 27
Pontesbury..January 2-23
Oswestry..Dec. 26, all Jan., Feb. 6-20
Wrexham..December 5
Gainsborough..All February
Liverpool..Every week
Warrington..Feb. 13-20 [20-27
Lerwick..Dec. 5-19, Jan. 9, 16, 30, Feb.

HOOPING COUGH.

Teignmouth..December 5
Canterbury..Every wk. except Feb. 27
Chatham..Jan. 30, Feb. 20-27
Wandsworth..Every wk. except Feb. 27
Upper Holloway..All February
Wanstead..January 9-16
Swansea..Every week
Saffron Walden..February 13
Bedford..Every week
Sharnbrook..All February
Newport Pagnell..Jan. 30, all Feb.
Stourbridge..February 6, 20
Beccles..Jan. 9-30, all Feb.
Thetford..Dec. 26, Jan. 16, Feb. 13
Barrowden..All Dec., Jan. 2-9, all Feb.
Wisbeach..All February
Pontesbury..Every week
Burton-on-Trent..January 9
Oswestry..Every week except Feb. 27
Liverpool..Every week
Warrington..Every week
Bolton-le-Moors..Dec. 5, 12, 26, Jan. 2, 16-30, February 6 13
York..Dec. 5-19, Jan. 9, 23, Feb. 13
West Auckland..All December

CROUP.

St. Mary's, Scilly..Jan. 23-30, all Feb.
Teignmouth..January 23
Chatham..January 2
Wanstead..December 19-26
Swansea..Dec. 12, Jan. 9-30
Bedford..December 19, January 16
Stourbridge..Jan. 23, Feb. 6, 20
Thetford..February 6-13
Dudley..February 6
Burton-on-Trent..February 27
Wrexham..Dec. 5, Jan. 2-9, Feb. 6
Alford..February 13
Liverpool..All Dec., Jan. 2-16, Feb. 20
Warrington..February 13
Bolton-le-Moors..February 13, 27
York..Dec. 12-19, Feb. 6-13

CATARRH.

St. Mary's, Scilly..February 13-27
Teignmouth..Dec. 5, 19, 26, Jan. 2-23, February 13-20
Chatham..All Dec. & Jan., Feb. 6-13
Wandsworth..Dec. 5, 26, Jan. 9 23,
Putney..Every week [Feb. 6-20
Upper Holloway..Jan. 30, Feb. 6-13
Swansea..Every week [20 27
Aspley Guise..Dec. 5, 26, Jan. 2, Feb.
Saffron Walden..Dec. 5-26, Jan. 9, all
Bedford..Jan. 2, 9, 30 [Feb.
Sharnbrook..All Dec. & Jan., Feb. 6
Newport Pagnell..All Dec., Jan. 9-23,
Stourbridge..Feb. 6 [Feb. 13-27
Beccles..Dec. 19-26, Jan. 2-16, Feb. 6-20
Thetford..All Dec., Jan. 16-30, Feb.
Barrowden..December 5 [13-27
Wisbeach..Every week
Burton-on-Trent..Every week
Oswestry..Dec. 12-26, Jan. 2-23
Alford..Jan. 2, 23, 30, Feb. 6
Gainsborough..All December
Liverpool..Every week
Warrington..All Dec., January 23-30, February 6-20
Bolton-le-Moors..Dec. 12-19, Jan. 2, 9, 23, 30, all February
Lerwick..All Dec., Jan. 2-9, Feb. 6-13

INFLUENZA.

Teignmouth..Dec.5-19,all Jan.,Feb.6,
Chatham..All Dec.&Jan.,Feb.6 [13,27
Wandsworth..Jan. 16, Feb. 13-20
Wanstead..All Dec. & Jan., Feb. 6
Swansea..Dec. 12-19, Jan. 16
Aspley Guise..January 16, 30
Saffron Walden..Every week
Bedford..Jan. 23, Feb. 6-20
Newport Pagnell..Every week
Stourbridge..All February
Beccles..December 5
Thetford..All Dec., Jan. 2, 9, 23, 30,
Dudley..Feb. 20 [Feb. 27
Barrowden..December 19
Wrexham..Dec.5,Jan.9-23,Feb.13-27
Lincoln..All February
Alford..February 13-27
Liverpool..All December
Bolton le-Moors..Jan.9,23,30,Feb.6
York..Dec.5,12,26,Jan.16 30,Feb.20
Lerwick..All Dec., Jan, 2, 9, 23, 30,
February 6, 20

ERYSIPELAS.

Teignmouth..December 5
Canterbury..December 5
Chatham..All Dec.,Jan.9,16,Feb.6,27
Wandsworth..Jan.9,16,30,Feb.13,27
Putney..February 6
Wanstead..December 26
Swansea..December 5 [Feb.6,20
SaffronWalden..Dec.5,26,Jan.16,23,
Sharnbrook..Dec. 5,Jan. 9, 23, Feb. 6
Newport Pagnell..Jan. 2, 16-30, Feb.
Beccles..Jan. 30, Feb. 6 [6-20
Thetford..Dec. 5, 19, 26, Jan. 23, Feb.
Dudley..Jan. 9, Feb. 13 [20-27
Wisbeach..January 23-30
East Dereham..January 23-30
Pontesbury..Jan. 2-16, 30, Feb. 6-13
Burton-on-Trent..February 13
Hawarden..Dec. 19, Jan. 2
Gainsborough..February 6-20
Liverpool..Dec. 19, Jan. 2, 9, 23, 30,
February 13-27 [13-27
Warrington..Dec. 26, Jan. 16-23, Feb.
Bolton-le-Moors..Dec.19-26,Jan.9-30,
York..February 6-13 [Feb. 6
Rothbury..February 27
Lerwick. Dec.5-12,Jan.16,30,Feb.27

CHOLERA.

Wrexham..February 20-27
Warrington..February 6, 20

AGUE.

Canterbury..Jan. 16-30, Feb. 12-27
Chatham..All Dec.,Jan.2-16,30,Feb.
Swansea..December 19-26 [13-27
Bedford..Dec. 20, all Jan., Feb. 6
Sharnbrook..February 27
Newport Pagnell..January 23, 30
Thetford..Dec. 19,Jan. 23, Feb. 13-20
Barrowden..February 13
Wisbeach..Every week
Lincoln..December 5-12
Gainsborough..All Jan. and Feb.
Liverpool..Dec. 26, Jan. 2
Warrington..February 13

REMITTENT FEVER.

Teignmouth..Dec.12,Jan.23,Feb.20
Canterbury..Jan. 30, Feb. 6
Putney..Dec. 12, Jan. 9, 23, Feb. 6-13
Aspley Guise..December 19
Saffron Walden..Dec. 12-26 [Feb. 6
Newport Pagnell..All Dec., Jan. 2-16,
Beccles..Dec. 5-12, Jan. 9-30, Feb. 6,
Wisbeach..Feb. 13-27 [20, 27
Oswestry..All February
Wrexham..February 13-20
Alford..February 27
Gainsborough..February 13-27
Liverpool..Dec.5-19,Jan.9,23,Feb.6,
Warrington..Jan. 26 [20, 27
Bolton-le-Moors..Dec. 12-26, Jan. 2,
16-30, February 6-20
York..Jan. 16, Feb. 20
Rothbury..Jan. 30, all February

DIARRHŒA.

Teignmouth..Dec. 12-26, Jan. 2, 30
Chatham..Dec. 5-19,Jan. 2, 9, 30, Feb.
Wandsworth..Jan. 16, all Feb. [6-20
Putney..Dec. 12-26, Jan. 2, 23, 30
Swansea..Dec.5-19,Jan.16, Feb.13-27
Aspley Guise..Dec. 5-12, Jan. 16-30,
February 6 [Feb. 6, 27
Saffron Walden..Dec. 5-19, Jan. 30,
Bedford..Dec.19-26,Jan.2-16,30,Feb.
Sharnbrook..Every week [13, 27
Newport Pagnell..Dec. 5, 19, 26, all
Stourbridge..Feb. 20 [Jan.& Feb.
Beccles..Dec. 5, 12, 26, Jan. 16-23]
Thetford..AllDec.,Jan.23-30,Feb.6,27
Dudley..Dec.5 19,all Jan.,Feb.6,20,27
Barrowden..Dec.19,Jan.2,23-30,Feb.
East Dereham..Dec.26,Jan.2-23 [6,13
Burton-on-Trent..Dec. 5, Jan. 30,
February 6, 20 [6, 20, 27
Hawarden..Dec. 5, 19, all Jan., Feb.
Alford..Jan. 23-30, Feb. 6, 20
Gainsborough..Every week
Liverpool..Every week
York..Dec. 12-19, Jan. 30
Rothbury..Dec. 19, Jan. 16-23
Lerwick..January 9, 23

DYSENTERY.

Teignmouth..Jan. 23, Feb. 13, 27
Chatham..Dec. 5, 26, Feb. 20-27
Wandsworth..February 13
Putney..December 5
Aspley Guise..Dec. 5, Feb. 20
Saffron Walden..January 30

Bedford..December 12-19
Newport Pagnell..Dec. 26, Jan. 2, 23, 30, February 6, 13, 27
Stourbridge..February 27
Beccles..January 9-16
East Dereham..Jan. 9 30, all Feb.
Pontesbury..January 16-30
Alford..Jan. 16, Feb. 20
Gainsborough..February 20 27
Liverpool..Every week

TYPHUS.

St. Mary's, Scilly..Every week
Canterbury..All Dec. & Jan., Feb. 6
Chatham..Jan. 23-30, all Feb.
Wandsworth..Dec. 5, 19, 26, Jan. 2-16
Putney..Jan. 9, Feb. 27
Aspley Guise..Jan. 30, Feb. 6-20
Saffron Walden..Dec. 5, Jan. 2
Bedford..Dec. 12-26, all Jan.
Sharnbrook..Jan. 16-30, Feb. 6
Beccles..Jan. 16, 30, Feb. 13
Thetford..All Dec. & Jan., Feb. 27
Dudley..All Dec. & Jan., Feb. 6, 13, 27
Wisbeach..Dec. 26, all Jan. & Feb.
East Dereham..February 20-27
Pontesbury..Every week
Lincoln..Dec. 12-26, Jan. 2
Gainsborough..All Dec. and Jan.
Liverpool..All Dec. & Jan., Feb. 6, 27
Warrington..Dec. 5-26, Feb. 6
Bolton-le-Moors..Dec. 19, Jan. 23-30, all February
Rothbury..Every week
Lerwick..February 20

PUERPERAL FEVER.

Chatham..Dec. 5, 12, 26, Jan. 2, 23, 30,
Swansea..Dec. 12 [Feb. 6, 27
Newport Pagnell..Jan. 9, Feb. 13
Pontesbury..February 13-27
Liverpool..All Dec., Jan. 2-16
Lerwick..January 16

CARBUNCLE.

Canterbury..Dec. 12-19, Jan. 9-23
Chatham..Dec. 19, Jan. 9-16, Feb. 6
Wandsworth..February 20-27
Saffron Walden..Dec. 5-12, Jan. 9, 23,
Bedford..January 2-9 [Feb. 6
Sharnbrook..Dec. 19, Jan. 30, Feb. 13-
Beccles..January 2-16 [27
Thetford..December 19
Dudley..Dec. 5, Jan. 2, 23
Barrowden. Jan. 9, Feb. 6
Wisbeach..February 13-27
Pontesbury..Jan. 2-16, Feb. 6-20
Burton-on-Trent..Dec. 12, Jan. 9
Gainsborough..Dec. 5-26, all Jan.
Liverpool..Dec. 26, all Jan. & Feb.
Warrington..January 16
Bolton-le-Moors..February 6
York..Dec. 12, Jan. 2, 23, Feb. 13-20
Rothbury..February 27

MUMPS.

Sharnbrook..Jan. 9-30, Feb. 6

TYPHOID FEVER.

Stourbridge..February 13, 27

ACUTE RHEUMATISM.

Wrexham..January 9-23

QUINSY.

Liverpool..All Dec., Jan. 2-16

ADDITIONAL OBSERVATIONS.

St. Mary's, Scilly.—Mr. Moyle writes: "We have had no cases of importance this quarter. Typhus still lingers in one locality, and has been fatal in one instance. The mortality has been one out of nine cases. The weather has been fine during the whole month. The winds have been principally west, south, and south-east. The amount of rain gauged in February at St. Mary's was 1.72 inch. The maximum temperature for the month was 55°; the minimum, 31.5. The cases of catarrh and influenza have been unimportant. Vegetation is appearing healthily in sheltered nooks."

Canterbury.—Mr. Rigden writes: "There has certainly been much less sickness and consequent mortality during the last three months, than in the corresponding period of either of the two preceding years. With an evidently increased population, the deaths in the three periods have been respectively—132, 130, and 111. Hooping-cough continues to prevail. Scarlet

fever seems gradually declining, and but a few cases of measles have been met with. The mortality tables shew deaths from scarlatina and purpura in December, from hooping-cough, scarlatina, fever, croup, influenza, and diarrhœa in January; and from croup, scarlet fever, fever, and purpura in February."

Mr. Haffenden furnishes the following returns, drawn up by eight observers for the epidemiological committee of the East Kent and Canterbury Medical Society:—

"*Abstract of Meteorological Observations for the Winter Quarter*, 1856-57.

	Dec. Deg.	*Jan.* Deg.	*Feb.* Deg.
Highest temperature in the day time....	46	49	44
Lowest.....	22	23	26
Mean	44·09	36·19	36·3
Highest temperature in the night	42	45	40
Lowest.....	20	23	21
Mean	34·473	33·14	32·3
Highest reading of the barometer	30·42	30·17	30·34
Lowest.....	28·75	26·08	29·45
Mean	29·723	29·138	29·948
Amount of rain in inches	2·22	2·83	·64

Direction of wind (the number indicates the number of days certain winds prevailed). *December* (only the last nineteen days observed)—N. 2, SW. 6, W. 6, NW. 5. *January*—N. 3, E. 1, SE. 1, SSE. 1, S. 3, SSW. 1, SW. 9, WSW. 1, W. 2, WNW. 1, NW. 4. *February*—NE. 2, E. 2, ESE. 1, SE. 1, SSE. 3, S. 9, SSW. 2, SW. 4, W. 4.

Abstract of the returns of Zymotic diseases during the Winter Quarter, 1856-57.

"Scarlatina. Fifty-two cases are reported this quarter; of these, thirty-seven occurred in the month of December, twelve in January, and three in February. The disease is reported to have been mild. There have been four deaths from it—all females; one, six years of age, had severe inflammation of the throat, and sank rapidly. Two of the age of six years, and one of two years, had the malignant form. Seven are reported to have been anasarcous, and two with albuminous urine. Hooping-cough shows a decrease this quarter. Eight cases are returned, seven of which occurred in one family. The father (a shoemaker) had been to measure a family of children, some of whom had hooping-cough; he then visited a child of his own, at the Kent and Canterbury Hospital, who shortly afterwards had the disease, and before the children at home. The first child who showed symptoms at home had been nursed on the father's knees shortly after his return to the house. Two of the eight cases died; one, a male aged three years, had pneumonia; and the other, a female twin aged one year, sank from the exhausting effects of the cough. Varicella: two cases occurred in the month of January; there has been no return

of it since. Measles, which had quite disappeared in the previous quarter, returned in three patients in the month of January. Only one case of croup occurred during the quarter; it proved fatal. Fever, next to scarlatina, shews the largest number returned, viz., thirty-one. The disease appears to have been very mild in form, and no death has resulted from it. Of ague, five cases occurred, being the same number as in last quarter. The type of the disease is usually tertian. Erysipelas and erythema: six cases of the former and two of the latter were returned—all of them females. In five, the head and face were the parts affected; and in three, the feet and legs. Cynanche was very prevalent in the month of December in the neighbourhood of Canterbury. Seven cases of diphtheritic inflammation of the fauces and tonsils came under the notice of Mr. Reid. They were attended with considerable fever, depression, and swelling of the tonsils, with more or less dyspnæa, and ringing cough. The fauces, part of the mouth, and especially the tonsils, were covered with soft pasty lymph, and in some places there were appearances of ulceration. The patients recovered in about four days, with some symptoms of debility remaining. One child died, after seven days illness, with all the symptoms of gangrenous sore throat. The total number of cases of zymotic diseases that have been returned during the quarter are 118, being the smallest number in any quarter since the formation of the society. The total number of deaths were seven, viz., four from scarlatina, two from hooping-cough, and one from croup."

Chatham.—Dr. Brown writes: "The epidemic of metria, which was noticed in last report, has continued. It has affected almost every surgeon's practice, and has very clearly declared itself non-infectious. The cases have *all* occurred in those parts of the town exposed to the river, excepting one case of putrid fever, occurring in a woman delivered of a child in a state of decomposition after three days labour, under the care of a woman. This was not a case of epidemic metria, but one of pyæmia. The deaths have been numerous: three have died out of seven cases that I have been advised of. I examined one case that died in four days. The woman, aged 33, was confined of a seven-months' child, and was seized with a violent diarrhœa in two hours. This passed into fever. Everything was found normal in the abdomen, excepting a pint of sero-purulent fluid in the peritoneal cavity. The lungs were studded with tubercle and carbonaceous matter, and presented many small vomicæ. I know of two deaths from puerperal convulsions during the last three months, one death from hydatids and hæmorrhage

in a woman twelve weeks pregnant, and one sudden death fifteen days after childbirth. Nothing was found to explain the death, excepting slight serous effusion in the pericardium. This case was not seen by me, nor was I present at the *post mortem* examination. One case of 'contagious furunculoid,' affecting the face, proved fatal."

Wandsworth.—Mr. Nicholas records that hooping-cough was the most prevalent, and fever the most fatal, of the zymotic diseases in this sub-district during the past quarter. Zymotics caused eleven deaths: of these deaths, three occurred from fever in the County Lunatic Asylum, which is situated nearly two miles from the town. The remainder (measles 1, hooping-cough 2, scarlet fever 3, and typhus 2) occurred *entirely* amongst the labouring class, and in houses which were either ill ventilated, over-crowded, or having defective drainage and water supply; three of them had no water supply. Diseases of the respiratory organs have been unusually prevalent and severe, especially amongst the aged.

Putney.—Mr. Whiteman writes: "Throughout the entire quarter catarrh has prevailed extensively. Two cases of scarlatina came under my notice in the earlier part of December, since which time, with the exception of diarrhœa of a mild character during December and a part of January, and two or three isolated cases of fever of a low type, occurring for the most part in undrained localities, there has been less disease of the zymotic class than I have witnessed for some years past. The drainage operations in the poorer localities of the town are progressing, and will, I am convinced, when completed, considerably lessen the amount of disease, especially amongst the labouring classes. A somewhat severe form of pleuropneumonia is reported to prevail amongst cattle."

Swansea.—Mr. Michael says, "a greater mortality than the average has prevailed during the past quarter. Hooping-cough, combined with pneumonia, has proved fatal to a large number of children, and many old persons have died. The very great and rapid changes of weather have proved particularly trying; and many persons have suffered from diseases of the respiratory passages."

Aspley Guise.—Dr. Williams writes: "The quarter ending February 27th has been remarkable for the suddenness of atmospheric changes, which has, no doubt, tended to produce the more than usual prevalence of epidemic disease in this locality —influenza, scarlatina, and diarrhœa. The scarlatina has been generally of a mild character, and confined to children. Two cases of latent scarlatina have occurred in one house. At the

commencement of the first case I was somewhat puzzled to account for the sudden and alarming appearance of general anasarca, more particularly as no cases of scarlatina had occurred in the house or the immediate neighbourhood. At that time I had not read Dr. Copland's excellent description of this rare form of the disease; but, from the similarity of the symptoms to the dropsy following the milder forms of scarlatina, I at once thought it must be connected with scarlatina poison in the blood. If any further doubt had remained upon my mind, it was in two or three days entirely removed by the occurrence of a similar case in a younger brother of the first patient. In the first case the urine was entirely suppressed for at least forty-eight hours, and when re-established, it was bloody and nearly black for some days. There was some sore throat, which Dr. Copland states to be generally *absent* in these cases. In the course of two or three days the breath became extremely offensive, as described by Johnstone, and quoted also by Copland. Both my cases recovered, though in the first case the difficulty of breathing almost amounted to suffocation. In both cases I gave ipecacuanha and calomel freely, and a saline mixture with tartar emetic and digitalis; mustard poultices and blisters were also useful. The worst case was attended by diarrhœa, which was treated by calomel and opium. I find that fever cases do best if the diarrhœa is allowed to proceed moderately. The case of typhus occurred in a house where two fatal cases of cholera occurred in 1854, and which is unfit for human habitation."

Saffron Walden.—Mr. Spurgeon states that the quarter has been healthy. Winds north and north-west, with little sunshine. Vegetation feeble, and spring flowers late. Variations in temperature considerable. Mr. Stear also writes: "Influenza has been the prevailing epidemic. It was most severe (especially amongst children) during the weeks ending Februay 6 and 13. It has also extensively affected cattle and horses, some cases proving fatal from the supervention of pneumonia.

Bedford.—Measles and hooping-cough have prevailed throughout the quarter. Ague and the allied forms of intermittent disease have been more frequent than for some years past, owing probably to the changeable and frequent foggy weather.

Sharnbrook.—Mr. Stedman says: "The cases of mumps (about sixteen in number) which came under my notice were very slight, and are the first cases which have occurred since the year 1849 in this district. From inquiry among other medical men, I find that the disease occurred in several adjacent localities during the months of January and February.

In all cases it appeared (as far as I can discover) spontaneously. Ozone has been very abundant all the quarter. During the last month there has been little rain. Vegetation has commenced early."

Stourbridge.—Mr. Freer writes: "This report dates from Jan. 16, soon after which date the report sheet was received. The quarter now past has presented fewer cases of epidemic disease than usual. Influenza has been prevalent during the last month. Many cases of small pox have occurred in the neighbourhood, but not in the town. Two only, however, under my own care; both in vaccinated persons. One was mild and discrete; the other was confluent, and is now under treatment. The town of Stourbridge is and has been for many years singularly free from epidemics. A case of fever is very seldom to be found in it, although the immediate neighbourhood has presented many severe cases of typhoid during the greater part of the past two years. During this quarter the only epidemic affecting the lower animals has been a sort of influenza in horses."

Thetford.—Mr. Bailey makes the following observations: "The extraordinary fluctuations of atmospheric pressure, during the month of December, were unprecedented, the maximum being, on the 16th, 30.50; and the lowest, on the 25th, 28.85. The weather was very dull and overcast, with twelve days of rains, fogs, and mists. The temperature ranged 15° on the grass, to 60°, in the middle of the day on the 7th and 8th, and then fell daily to 23° on the grass, on the 16th. On the following day the highest was 33°. It thus assumed a December temperature, averaging 40° to the 27th. After this period the cold became excessive; in the night of the 27th the minimum degree was 13°, and on the 31st it rose to 28°—a range of 17°. The same epidemic existed in the neighbouring village as in November, and those who had hitherto escaped became the victims of the disease. The disease chiefly attacked the improvident and badly habited. Catarrh and influenza were very prevalent in this month, evidently from the rapid changes of climate. In old people, influenza was not only severe, but fatal in some cases. Pleuritic and pneumonic diseases also came under notice amongst the working classes, requiring the most active treatment, and erysipelas occurred in three cases. Children also suffered from the changes, and from imprudent exposure to the severe cold. Bronchitic affections were common with them, and in the very young terminated fatally. In all the cases of fever, diarrhœa preceded the attack, producing the most severe exhaustion; the cases, unless early attended to,

fell into low fever. One case of carbuncle occurred in this month in an old and very poor man; he ultimately did well. The casual diseases under treatment during this month were menorrhagia, nephritis, neuralgia, chlorosis, hypertrophy of the heart, syphilis, gonorrhœa, and some cutaneous affections.

"The same vacillating state of atmospheric pressure continued in the month of January as in the previous month, ranging from 30.30 to 28.80. The weather was, during twenty-three days, rainy and overcast, with fogs and hail. There were thirteen windy days; the amount of rain was 1.88 inch. The temperature of the month ranged between 50° and 18°. The transitions were not so sudden. This state of climate lessened the amount of illness amongst the poor. The cases of fever were reduced in number, but some deaths occurred. Rheumatism and pleurodynia were more prevalent with working men; and among children, bronchitic disease was unusually prevalent, from the careless habits of the parents in exposing them to the cold. Influenza was less frequent this month; three cases only came under treatment. Cynanche tonsillaris in females came under notice. Only one case of erysipelas occurred. No specific infectious disease occurred during this month. The casual diseases under treatment were epistaxis, abdominal tumour, hysteria, tic douloureux, hydrothorax from diseased heart, asthma, and some cutaneous eruptions.

"The month of February brought comparatively spring weather. The little fluctuation of the barometer during the month, being only 0.7, the temperature varying daily but a few degrees, the little wind, and the paucity of rain, produced great changes as to the healthiness of the month. Of the epidemic low fever, only one case occurred during the month, and it is progressing favourably towards recovery. One case of hooping-cough occurred from exposure to cold. Two cases of spasmodic croup were fatal in the same family, after a very few hours attack; a third case occurred in an elder daughter, in whom the most active treatment was pursued, and she recovered. Only one case of influenza occurred during the month, and catarrhs and coughs were less prevalent. Erysipelas now and then came under notice; in one case, in which it attacked the leg of an elderly gentleman, it arose from a slight accident, in a habit exceedingly predisposed to it. Ague was under treatment in two cases in this month; it occurred in labouring men who had been working in the river. Pleurodynia now and then came under our care, but was soon relieved. Now and then a case of bronchitis was presented. I consider this month to have been unusually healthy. The casual diseases were valvular disease of the heart,

ascites, tic douloureux, syphilis, hydrocele, spermatorrhœa, fracture, cardialgia, gout, and impetigo.

"From information I receive from the veterinary surgeons, I find that much disease existed during this quarter amongst the horses—sore throats, glanders, and pneumonia. The diseases have been very serious, attended with fatality; the same complaints have attacked the herd stock. Fevers have also been prevalent amongst them. But during the last month a considerable change has taken place; they are become more healthy. No complaint exists amongst the sheep, and there is a good prospect for the yeaning time. There is no lack of food for them. The few lambs already yeaned are remarkably strong and healthy."

Record of Deaths in Twenty-one Parishes (*population* 9,574) *from the Registrar's Book.*

December.		*January.*		*February.*	
Cancer of the face ..	1	Decay of nature	1	Pneumonia	1
Croup	1	Bronchitis	1	Diarrhœa.....	1
Consumption	2	Atrophy	2	Decay of nature....	6
Accidental death....	1	Consumption	3	Dropsy.....	1
Pneumonia	1	Fever	1	Lumbar abscess	1
Fever	1	Hæmorrhage	1	Spasmodic croup ..	2
Decay of nature	3	Diseased heart	1	Valvular disease of heart	1
Dropsy.....	2	Tabes mesenterica .	1	Fever	4
Premature birth....	1	Typhus	1	Consumption	1
Anæmia	1				
Debility	1				
Diseased liver.....	1				
	16		12		18

Dudley.—Mr. Houghton writes: "The predominant feature in the health of Dudley during the thirteen weeks ending February 27th has been a widely spread eruption of small pox, attacking all classes and all ages of persons, and proving fatal to fifty individuals. Of the fifty persons who died, eleven are said to have been vaccinated and twenty-six not. No report has been made on this point on the thirteen remaining cases. The proportion of deaths after vaccination, according to this statement, is enormous, being more than one in three of the whole deaths. There is good reason to doubt the efficient vaccination in these cases. In one case under my own observation modified small pox occurred a second time after vaccination; the patient was about 60. In some cases the eruption was preceded for some days by a rash, almost exactly resembling measles in its appearance, but not accompanied by the usual catarrhal symptoms. Scarlet fever has proved fatal in four cases only; one of these being quite irregular in its manifestations, and of intense malignity. Four days of extreme

constitutional disturbance, the principal feature of which was agonising spasmodic pain in the loins, ushered in a rash, so full that it was with difficulty diagnosed from erysipelas when it first appeared, the throat affection being slight; low delirium followed with extreme prostration; on the third day of the rash she miscarried; on the fourth, petechiæ appeared early in the morning; and it is no figure of speech to say that she died *purple* in the evening. There was nothing in the place or the position of the patient to account for this malignity. Fever and diarrhœa have as usual prevailed during the whole quarter. During this period, 333 deaths were registered; the average of the spring quarter of the last eight years being 295; 85, or 1 in 3·915, arose from zymotic diseases. In the corresponding period 16,009 deaths were registered in the metropolis, 2,835 being from zymotic diseases, or 1 in 5·646. Thus the sanitary condition of Dudley contrasts very unfavourably even with overgrown London."

Barrowden.—This district for the quarter has been very healthy in comparison with last year. Hooping-cough still continues to spread. Diarrhœa, after the break up of the frost, was very prevalent for a fortnight. The wind has been west all winter, with a few days' exception.

Wisbeach.—Mr. Hole states that there has been more typhus in this town during the last quarter, coming under his own notice, than at any other period of his residence here.

East Dereham.—Three cases of small pox occurred, all after vaccination; these were very slight, but plainly marked. Two patients were adults and one a youth. (Dr. Vincent.)

Pontesbury.—Two cases of puerperal fever occurred at the same time in February. Scarlet fever, measles, and typhus have been very prevalent through the neighbourhood. (Mr. Eddowes.)

Burton-on-Trent.—Dr. Thomson says: "By far the most frequent diseases during the last quarter, so remarkable for its atmospheric vicissitudes, have been the various forms of catarrh and bronchitic affections, in addition to pneumonic and pleuritic cases. Neuralgia, especially sciatica, has been frequent; but the most unusual addition to our diseases has been jaundice, occurring chiefly among children under ten years of age. Case after case has occurred, and, in one instance, two cases in one family. Girls have been more generally attacked than boys, at least under my observation. The disease has always yielded readily to treatment."

Oswestry.—Mr. Cartwright records that "small pox was imported from Staffordshire, and confined itself to the immediate

neighbourhood of the original case. Two of the subjects had not been vaccinated; the others had the disease modified."

Gainsborough.—Dr. Mackinder writes: "We have had rather more than the usual amount of sickness this quarter, but no epidemic. Since the end of January, I have not had a single case of typhoid or continued fever; but a few children have been affected with remittent fever. On each side and passing under the house in which the best marked case occurred, there is a common sewer, the stench from which is often intolerable. There have been a few cases of diarrhœa, dysentery, erysipelas, bronchitis, tonsillitis, and measles. Four cases of scarlet fever occurred in one house, where the poison seemed to originate and exhaust itself. I have had three cases of phlegmasia dolens; one was a poor woman far advanced in phthisis, and the other two were very anæmic subjects. I have had one case of carbuncle and one of croup. The importation and propagation of small pox, of which there have been three cases, have created a little alarm. The first case was a young sailor, who disembarked at Liverpool, from New Orleans, on January 14th. He remained at Liverpool two days, and then proceeded to Hull, where, during his brief sojourn of a couple of days, he saw a friend who was recovering from small pox. He then came to Gainsborough, and ten days after his arrival was seized with the disease. At the expiration of ten more days a brother became affected, and then the mother, aged 57, was attacked. All the cases were mild ones. The young men had been vaccinated; but the mother could not certify to the inoculation of herself. Another brother, who had sailed in the same ship from New Orleans, but had not been to Hull, escaped; nor has he yet suffered from his exposure to the infection at the house of his parent. I have had a case of tertian ague in a village four miles hence. My patient was an old woman who had been ill for some weeks. About a yard from her dwelling there was a filthy open drain; this, on being reported, was ordered by the board of guardians to be immediately cleaned out. The house is one of those low, dark, mud-walled, thatched, indefinable mediæval structures which are a disgrace to any civilised community."

The following meteorological report is furnished by Mr. Dyson: "The severe weather with which the month of December opened continued only for a few days; a thaw commenced on the 5th, and the remainder of the month was changeable to the end. The weather continued unsettled throughout the quarter; showers, fog, and sleet alternating. The last night in January was intensely cold; the thermometer

fell to 12°, and to 19° the following night; in other respects the temperature was above the average nearly all the quarter. The amount of rain which fell in December was 1·46 in.; in January, 2·44 in.; and in February, ·85 in. Ozone was freely developed from the 5th to the 14th of December, the whole of February, but very slightly in the month of January. Dense fogs prevailed the last fortnight of February. Throughout the quarter the weather may be described as 'unsettled' till the 5th of February."

Liverpool.—Mr. Bickerton forwards the following report, compiled by the excellent medical officer of health to the borough, Dr. Duncan, and read by the clerk to the Health Committee: "During the year ending 27th December last, 11,574 deaths were registered in the borough, being 931 fewer than in the preceding year, and giving a lower ratio of mortality than has ever previously been recorded in Liverpool. In 1850, as a consequence of the high mortality from cholera in the previous year, the deaths were fewer in number; but allowing for increase of population, the mortality of 1856 was a fraction lower than that of 1850. During the previous ten years, the deaths averaged 36 annually in every 1,000 of the population; in the last five years of this term, they were 31 in 1,000; last year, they were 27 in 1,000 of the population. From diseases of the zymotic class, the deaths were 3,070: the average of the previous five years being 3,510. With the exception of scarlatina in the first and last quarters of the year, and diarrhœa, which caused a large infantile mortality in the hot weeks of summer, no disease of this class was more than usually prevalent. Typhus, which was formerly the opprobrium of Liverpool, and the prevalence of which is usually considered a test of a low sanitary condition, caused only 342 deaths, being 61 fewer than the number in the previous year, which was itself the lowest ever recorded up to that time. It is satisfactory to know that this diminished mortality from fever is not, apparently, dependent upon casual or accidental causes; for if an average of years be taken for comparison, the decrease is most obvious and decided. In the four years (1837-40) immediately subsequent to the passing of the Registration Act, one in about 450 of the inhabitants of Liverpool died from fever annually; while in the last four years (1853-56), the yearly deaths were not more than one in 1,035. In the metropolis, during the same periods, the fever deaths were one in 690, and one in 987, respectively. The contrast is gratifying, and may be taken as an index of the extent to which sanitary operations have been carried out in the respective places.

Last year (1856), the deaths from fever in Liverpool were one in 1,235; and in the metropolis, one in 989 of the population. Diarrhœa caused 766 deaths, of which 661 were in cases of infants or children; and nearly one-half of the whole took place in six weeks between the 2nd August and the 13th of September. Of 643 fatal cases of scarlatina, 428 occurred in the March and December quarters; hooping-cough caused 444 deaths; measles, 310; croup, 158; small-pox, 98—of which 24 were reported as after vaccination, the remainder being unvaccinated; syphilis, 65; dysentery, 60; infantile and remittent fever, 55; erysipelas, 46; thrush and canker, 29; cholera, 26; purpura, 9; scurvy, 5; mumps, 5; influenza, 4; chicken-pox, 4; ague, 1. From hooping-cough, remittent fever, cholera, and purpura, the deaths were exactly the same in number as in the previous year; in the other diseases of this class there was a decrease, with the exception of diarrhœa, already mentioned, and of small-pox, which caused four deaths more than in the year preceding. This disease at present shows some disposition to increase, the deaths in the last five quarters having been respectively 15, 17, 18, 28, and 35; and in the first eight weeks of the present year, 32. Disease of the lungs caused 3,420 deaths, including 1,406 from consumption. The average of the preceding eight years was 3,513, including from consumption, 1,470.

"The mortality in each quarter was as follows, viz.

	All causes.		Disease of lungs and consumption.
March quarter.....	3,145	....	1,102
June quarter	2,626	....	868
September quarter.....	3,041	....	603
December quarter	2,762	....	847

The deaths from consumption in the four quarters consecutively were 408, 385, 311, 302.

"Inquests were held on 643 cases of sudden or violent deaths (449 male, 194 female—233 children, 410 adults). Of these, there were from excessive drinking, 43; starvation and cold, 1; want of assistance at birth, 1; accidentally poisoned, 3; burns and scalds, 86; hanged for murder, 1; suffocation, 74; drowning, 63; accidentally killed, 188; murder, 16; manslaughter, 18; natural disease (specified), 13; ditto (not specified), 115; suicide, 21—of which by hanging and strangling, 9; drowning. 1; poison, 5; cut throat, 6; jumping from window, 2. Of the suicides, 18 were males and 3 females (two of these unmarried). The poison used was in two cases laudanum, in one prussic acid. Ten of those who committed suicide were persons in good circumstances. The extreme ages

were 19 and 70. Of the cases of accidental drowning, 34 occurred in the docks, 18 in the river, and 9 in the canal. Of those accidentally killed, 24 were by carts and carriages, and 7 by railway accidents. Sixty-five deaths (one less than in the previous year) were ascribed to the direct effects of intemperance; besides which, seven fatal accidents occurred to persons in a state of intoxication, five of these being married women. Of the entire number, 45 were males, and 27 females; and of these last, 18 were married, 3 were widows, 3 unmarried, and 3 unknown. Eight were from 23 to 30 years of age; 22 from 30 to 40; 28 from 40 to 50; 12 from 50 to 60; and 2 were respectively 65 and 68. A married woman, aged 37, died from the long continued use of opium.

"The rate of mortality, of course, varied much in the different districts of the borough, ranging from 21 in 1,000 in North Toxteth ward, to 39 in 1,000 in Vauxhall; the latter, as has invariably been the case, presenting the highest district death rate. The following table, in which corrections have been made for deaths in workhouses and hospitals, shows the relative mortality of the different districts:—

Wards, etc.	Deaths.		In 1000 inhabitants
Vauxhall	863	....	39·4
St. Anne's	738	....	35·5
Exchange	475	....	33·4
Scotland	2061	....	31·4
Lime Street	425	....	29·0
St. Paul's	379	....	28·7
St. George	482	....	28·4
Castle Street	199	....	27·0
Pitt Street	205	....	25·7
Abercromby	535	....	23·3
St. Peter's	184	....	21·7
Rodney Street	421	....	22·1
Workhouse and Fever Hospital	908	....	—
Hospitals	346	....	—
Parish of Liverpool	8,181	....	29·9
Everton and Kirkdale	1,065	....	24·7
South Toxteth	867	....	24·0
West Derby	588	....	21·1
North Toxteth	661	....	20·8
West Derby Workhouse and Fever Hospital	196	....	—
Kirkdale Gaol	3	....	—
Industrial Schools	9	....	—
Out Townships	3,393	....	22·7
Borough of Liverpool	11,574	....	27·3

"Of all who died during the year, 6,062 were males, 5,512 females; the death rate being for the former 296, and for the latter 253 to 1,000. The ages at death were: below 1 year, 3,017; 1 to 2, 1,519; 2 to 5, 1,473; 5 to 15 years, 746; 15 to 20, 252; 20 to 40, 1,668; 40 to 60 years, 1,640; 60 to 80,

1,048; and above 80 years, 178; unknown, 33. Of 16 persons who died at the age of 90 and upwards, 14 were females; one of these, formerly a domestic servant, being recorded as 'about 100 years' old at the time of her death.

"The births registered during the year in the parish were 9,270, being 80 more than in the preceding year, and giving an excess of 1,089 over the deaths. In the out-townships, the births were about 5,584, 240 more than in the preceding year, and giving an excess over the deaths of 2,191. The total births in the borough were thus 14,854, and the excess of births over deaths 3,280, being about double that amount to be added to the population of Liverpool by immigrants from other places. The births have been in the proportion of 35 to every 1,000 inhabitants; in the metropolis, the proportion was 33 in 1,000."

Mr. Bickerton makes also the following weekly statements: "Dec. 6th, 1856. The extreme cold that set in the previous week had a sensible effect in increasing the mortality. There were registered 244 deaths, being 35 more than in the previous week, and more than in either of the last 13 weeks. Diseases of the lungs caused 92 deaths; 22 being from phthisis, the remaining 70 from inflammatory diseases, being a greater number in any week since the intense frost in the spring of 1855. Scarlatina caused 18 deaths; measles, 4; small-pox, 5 (three not previously vaccinated); typhus, 8; croup, 10; hooping-cough, 8; syphilis, 2. There were more deaths from croup than ever before registered in Liverpool: 144 of the deaths occurred in children, 100 in adults. The mean temperature was low, 35·8, until Saturday; on Thursday it was 29·5; on Saturday it rose to 48·75, the average being about 53·5, consequently the temperature for the week was nearly 7 degrees below the average for the same week during last ten years. Rain fell every day except Sunday; total amount ·045 inch.

"Dec. 13th. There was a great decrease in the mortality of the town owing to the much milder temperature that prevailed. The number of deaths registered was 179, being 65 less than the corrected average for preceding eight years. Scarlatina caused 17 deaths; measles, 4; small-pox, 0; typhus, 8; hooping-cough, 4; croup, 4; erysipelas, 2; diarrhœa, 1. There were 90 deaths below 15 years of age, and 21 above 60. The mean temperature rose from 35·8 to 51·9.

"Dec. 20. 196 deaths were registered, being 42 less than the average for the corresponding week of previous eight years. Scarlatina caused 10 deaths; measles, 9; small pox, 4 (3 not previously vaccinated); typhus, 10; hooping-cough, 4; influenza, 1; syphilis, 1. Diseases of lungs 74 (32 from consumption).

"Dec. 27. The deaths registered during the past seven days were 191, being 55 less than the average. Scarlatina caused 16 deaths; measles, 5; small pox, 7 (3 not vaccinated); typhus fever, 10; hooping-cough, 8; scurvy, 1, being the only death from this disease during the last fourteen months. Diseases of lungs caused 64 deaths; 28 in children, and 36 adults. The weather was unsettled wet till the 24th, then thunder and lightning, followed by a heavy fall of snow and frost.

"During the three months ending 31st Dec., 1856, the deaths from all causes were 2,759; including 699 sudden, violent, and deaths in hospitals. The corrected average for the past nine years, for the same quarter, is 3,379. Liverpool is rapidly rising from being one of the most unhealthy to one of the most healthy towns in the kingdom. Zymotic diseases caused during the quarter 737 deaths, the average being 915. Of these, scarlatina caused 228; measles, 79; small pox, 35 (10 only having been vaccinated); typhus fever, 105; hooping-cough, 65; croup, 57; diarrhœa, 103. Diseases of the lungs, 835. In connection with these, it must be stated that the mean temperature of the quarter was higher than the average.

"Jan. 3, 1857. There was an increase in the mortality, 226 deaths having occurred, being 35 more than the previous week; the average for the week, however, was 250. Scarlatina caused 13 deaths; small pox, 1; hooping-cough, 9; diarrhœa, 7; ague, 1; measles, 11; typhus, 8; croup, 0; syphilis, 2. Diseases of lungs caused 81 deaths, owing to the very cold weather that prevailed from the 25th Dec., 1856, to Jan. 1, 1857.

"Jan. 10. 197 deaths were registered during the past week, being 73 less than the average. Scarlatina caused 9 deaths; measles, 12; small pox, 5 (2 only being vaccinated); typhus, 4; hooping-cough, 7; croup, 1; diarrhœa, 11; ague, 1. Diseases of lungs 61; delirium tremens, 1. The weather was fine and cold.

"Jan. 17. 218 deaths occurred, being 37 less than the average. Scarlatina caused 7 deaths; measles, 4; small pox, 8 (4 not vaccinated); typhus, 5; hooping-cough, 5; croup, 4; syphilis, 5; diseases of lungs, 79. The mortality from small pox was higher than in any week of the preceding five years.

"Jan. 24. There was another slight increase in the number of deaths. 241 deaths from all causes were registered; but this number does not reach the corrected average for the last nine years, nor can we be much astonished at this increase when we consider the very great and sudden changes in the temperature and general state of the weather during the past 30 days. There were 90 deaths from chest affections. Deaths from other causes, scarlatina, 17; hooping-cough, 7; typhus, 11; puer-

peral fever, 1; measles, 10; diarrhœa, 7; infantile remittent, 8; small pox, 3 (one not vaccinated); syphilis, 3.

"Jan. 31. There were 217 deaths registered during the week, being 33 less than the average. Scarlatina caused 6 deaths; measles, 8; hooping-cough, 6; typhus, 3; diarrhœa, 3; syphilis, 5. Diseases of lungs caused 89 deaths, 31 being from phthisis. 94 deaths occurred in children below five years of age, and 1123 in persons above five. The weather was unsettled and changeable, but wet and cold generally.

"Feb. 7. There were 238 deaths registered during the week, being 21 more than in the preceding week, but fewer by 14 than the corrected average. Scarlatina caused 10 deaths; hooping-cough, 2; measles, 6; small pox, 4; typhus, 2; diarrhœa, 2; syphilis, 2. From diseases of lungs the deaths were higher than in any week of the last 12 months, the number being 95. (37 from phthisis.) This was owing to the very severe weather, cold and changeable, which has been also very destructive to the old, 42 of the deaths being in persons above sixty.

"Feb. 14. There were registered during the week 231 deaths, being 10 below the corrected average. Scarlatina caused 9 deaths; measles, 10; small pox, 4 (three not vaccinated); typhus fever, 9; diarrhœa, 2; syphilis, 2. A woman aged 58 died from convulsions induced by spirit drinking. Diseases of lungs caused 102 deaths, a greater number than has occurred since the spring of 1855.

"During the latter weeks of February, and at present (March 2) there has been a species of cynanche tonsillaris existing in horses. I am told by one of our most respectable veterinary surgeons that some new cases have come under his care."

York.—There has been a greater amount of disease in February than in the preceding months, but this has not been very extensive. Hooping-cough, measles, and carbuncle have been very prevalent. There have also been several cases of cramp, which is not here of frequent occurrence. (Mr. Proctor.)

West Auckland.—Mr. Todd says:—"The principal epidemic diseases which I have had to treat during the last quarter have been measles, hooping-cough, and scarlet fever. Measles prevailed during the month of December, and in a large majority of the cases were complicated with a low form of inflammation of the bronchia and lungs. Many deaths resulted from this complication. The weather during the month of December was intensely cold. Hooping-cough prevailed during the same month, and, like measles, was in many cases complicated with a fatal form of pneumonia. During the months of January and February scarlet fever has, and still continues to prevail.

Many cases have been attended with very severe affection of the throat and the glands of the neck. Several cases have been followed by anasarca and effusion into the chest. Upon the whole the epidemic is of a very malignant nature, and many deaths have resulted. Many children suffer from a low form of pneumonia independent of measles and hooping-cough."

Rothbury.—Mr. Summers writes:—"The principally prevailing diseases in this district have been typhus among adults, and remittent fever among children. The cases of typhus have generally been marked at first by bilious symptoms; afterwards by great debility and a tendency to affection of the head. In this, and indeed in almost all diseases for some time past, great nervous depression appears to me peculiarly prominent; and I find that accordingly typhus patients bear stimulants almost from the commencement; and, even in inflammatory complaints, I have for some time noticed that patients bear very little depletion, and this notwithstanding that the general *physique* of the people of this district is considerably above the average as to robustness and general vigour. Of the children who have been attacked with remittent fever, some have been in houses where typhus was existing, others where there could have been no typhus *infection*. These remittent cases, however, have been marked, like those of typhus, by great depression and a tendency to affections of the head. In several cases I have noticed a remarkably distinct eruption of very fine and numerous spots all over the body; and in a case of a child between 2 and 3 years old, I could see nothing to distinguish it from a case of typhus in the adult, except that the remissions were, for the first week, tolerably distinct."

Lerwick.—Dr. Spence says:—"The winter commenced early; there were several heavy falls of snow, which, however, never lay long; the cold was not great, but the weather was extremely variable and boisterous, with frequent heavy gales; the prevailing winds were from the S. W. Acute articular rheumatism was unusually prevalent, as were also muscular pains and pleurodynia. Small pox was twice imported from Leith, the first time in January, and the second in February. The number of cases of this disease was not great, and there were no deaths. I did not see the case returned as typhus till near its termination, and am by no means certain that it was not a case of the typhoid stage of influenza. The case returned as puerperal fever was probably, more correctly speaking, tubercular peritonitis, and occurred in a woman in an advanced stage of phthisis. One woman died at the advanced age of 101, and the average age in the cases of death under my observation (exclusive of the case of longevity just mentioned) was 53."

SANITARY LEGISLATION.

THE dissolution of Parliament, and the events preceding have stopped the progress of all active sanitary legislation. Still one or two interesting documents have been published bearing on this subject. Mr. Gamgee has addressed a bold and admirable letter to Sir George Grey, on the subject of "*Diseased Animal Food.*" He shows that diseased beasts—some hide-bound with abscesses in various parts of their bodies; others labouring under typhus and various loathsome diseases—are constantly being brought into the London markets, sold, and cut up for human food. He does not flinch at naming such inspectors and officials as are incompetent for their duties; he points out the inefficiency of the laws for preventing the disgusting traffic in diseased animals; shows the impending danger in the possible propagation of the cattle murrain; and suggests that, in London, all private slaughterhouses should be abolished, and be replaced by public ones. If anything could rouse a minister to the exertion of ministerial power, this letter is the very thing to do it. But in England the people do the reforming work; and to them we recommend Mr. Gamgee to submit his appeal. Here it requires the voices of millions to enliven a single "Right Honourable"; on the continent a single voice rules millions. This is the grand political fact for enthusiastic reformers on this side the channel. The nation wills, the minister obeys.

MEDICAL ORGANISATION OF THE RUSSIAN ARMY. An interesting Report on this subject has been drawn up by Dr. Mouatt and Mr. Wyatt, and presented, through Dr. Andrew Smith, to the Minister of War. It seems that the Russian army, during the Crimean campaign, suffered mainly from intermittent fever. The hygiene of the army was evidently not effective, but was much more thoughtfully considered than our own. Their medical officers were intelligent, but too few in numbers; they were seldom consulted in the selection of sites for camps, and were, on the whole, badly treated. The huts for the men were ill ventilated; some of the hospitals were arranged with care, but were sadly overcrowded; while the dietary system, both for the healthy and sick, appears to have been founded on anything but physiological data. We regret that we are prevented, by a want both of space and of time, from referring at greater length to this document.

THE DRAINAGE OF THE METROPOLIS question remains under the consideration of the new Commissioners, who are open, we believe, as yet, to the reception of plans. The papers published in this number of our REVIEW, afford a slight indication of the great differences of opinion which prevail regarding this important undertaking; and, as the Commissioners are doubtless overwhelmed with plans, based on views equally conflicting, their decision cannot be expected speedily.

THE

SANITARY REVIEW.

JULY 1857.

THE SWEATING SICKNESS IN ENGLAND.*

THERE are few subjects which exhibit more points of interest to the epidemiologist and medical historian, than that series of epidemics, of the fifteenth and sixteenth centuries, which went by the name of English Sweating Sicknesses. We are chiefly indebted to a learned German professor, Dr. Hecker, and to his translator Dr. Babington, for the acquaintance we in the present day have with these events; and we would here observe that, in whatever light we may view Professor Hecker's deductions and theories, there can be but one opinion as to his faithfulness and diligence as a medical historian. As his work, however, is published by a society, and is therefore of somewhat limited circulation, we have thought a short historical sketch, embodying, and in some instances slightly amplifying,

* HECKER'S Epidemics of the Middle Ages. Translated by B. G. BABINGTON, M.D. Sydenham Society Edition. London: 1844.
JOHN CAIUS, M.D. A Boke or Counseill against the Sweat. London: 1552.
JOHN CAIUS. De Ephemerâ Britannicâ. Reprint. London: 1721.
State Papers published by Royal Commission. 1830.
HALL. Vnion of the two Noble and Illustre Famelies of Lancastre and Yorke. 1548.
GRAFTON'S Chronicle. 1560.
STOW'S Chronicle, by HOWES. London: 1611.
FABIAN'S Chronicle. London: 1559.
HOLLINSHED'S Chronicle. London: 1587.
Chronicle of the Grey Friars of London. Edited by J. G. NICHOLS. Camden Society. 1852.
Diary of Henry Machyn, Citizen of London. Edited by J. G. NICHOLS. Camden Society. 1848.
OWEN and BLAKEWAY'S History of Shrewsbury. London: 1825.
Collection of English Topographical Histories. Various.
Sir H. ELLIS. Original Letters. London: 1824.
Letters of the Kings of England. By J. O. HALLIWELL, F.S.A. London: 1848.
Harleian Manuscripts.
Cottonian Manuscripts. Titus, b. xi.
Lord BACON'S History of Henry VII. Op. b. iii. London: 1740.
ANTHONY à WOOD. History and Antiquities of University, Oxon. 1674.
Publications of the Parker Society. 1846-53.

Professor Hecker's researches on the subject of the ravages of the disease in England, might not be uninteresting to our readers; who will then be in a position to follow us on some future occasion in a discussion of the nature of a malady, which five times within a hundred years devastated our island, and once, and once only, spread its ravages amongst the Teutonic races on the continent of Europe.

We may preface our historical *resumé* by noticing that the disease, in the form in which it then presented itself, was unknown before the year 1485, and that it has never reappeared since its last outbreak, in 1551. Its novelty gave it one of its appellations; it was called by the common people the "new acquaintance"; whilst its limitation to British soil gained for it on the continent the names of the King of England's Sickness, the English Sweating Sickness, *Sudor Britannicus.*

Characterised by the suddenness of its seizure, by its short and defined course of twenty-four hours, by its great fatality, by the profuse and fetid perspiration in which the patient was bathed, and from which the disease derived its most common name, by the frequency with which it attacked the same individual several times within a short period, or perhaps, we should more correctly say, by its relapsing tendency, by its selection of strong and robust men in the prime of life as its victims, by the equality with which it invaded the palaces of the rich and the cottages of the poor, we cannot wonder at its producing a marked effect on the national mind, and being long held in remembrance. Even as late as the days of the great rebellion, occasional references may be found to it in popular sermons and treatises; whereas we might have supposed its memory would have been effaced by the frequent outbreaks of plague which had intervened. The sweating sickness has come down to us as the remarkable epidemic of a remarkable age. In an era distinguished by the emancipation of thought, by the spread of letters, by the splendours of a social and religious reformation, death appeared in a new garb, and in unwonted tones asserted his dominion.

It has been a frequent observation, that epidemic diseases have had their origin in camps; and it is perfectly needless here to remind the reader of instances. Such will present themselves to every student of history. The English sweat is stated by Caius to have first appeared in the army of the Earl of Richmond, shortly after their landing; and doubtless they were predisposed by the circumstances of the expedition, by their confinement during their voyage in close, dirty ships, and especially by their previous habits (for they are described by

Philip de Comines as recruited from the loosest and most profligate class in Normandy), to suffer from any disease. But it is perfectly clear that, granting the distemper to have first appeared in the invading force, it was not long limited to it. It must quickly have spread amongst the population ; as we learn from the *Historia Croylandensis* that, a few days after the landing of the earl, Lord Stanley excused himself from joining Richard III, by alleging that he was attacked by the new disease, he being then at his seat in Lancashire. A mere excuse, no doubt; but such as would not have been urged had not the progress of the epidemic rendered it possibly true. We likewise have proof that a fatal disease reigned at the time in York, although we lack information as to its precise nature. On the 16th of August, 1485, it was determined in the town council to send a messenger to King Richard with the offer of a force "for subduing of his enemies lately arrived in the partes of Wales".- "Also it was determyned that all such aldermen and other of the counsail as was sojournyng, for the plage that reigneth, without the citie, should be sent for to give their best advises in such things as concerned the wele and savegard of the said citie, and all other inhabitants of the same" (Drake's *Eboracum*, b. i, p. 120). It is moreover remarkable, that, although the circumstances of the march of Richmond's army, and of its final struggle and victory, have come down to us with tolerable minuteness, no mention, as far as we are aware, is made by the chroniclers of any pestilence tracking their course. The battle was fought on the 22nd of August ; and before the end of that month the epidemic appeared at Oxford, a town through which the army is not reported to have passed, and which, devoted to learning, may be supposed to have suffered less from military occupation than other places.

Whilst, however, the assertion that the malady commenced amongst the soldiery of the Earl of Richmond rests principally on the authority of Dr. Caius, who wrote his account three-quarters of a century after the event, yet, in the lack of other evidence, we believe we must receive it. Caius was evidently aware of the interest and importance of his subject, and would scarcely have hazarded such a statement had he not been assured of its truth. On the other hand, it is a groundless assumption to claim for the sweating sickness a foreign origin. No such disease had appeared in Normandy, Brittany, or elsewhere on the continent; and there is no reason for supposing other causes present to produce the first epidemic of 1485, than those which resulted in the outbreak of 1551, when it com-

menced at Shrewsbury, and importation from abroad was simply out of the question.

It was on the evening of the 1st of August, 1485, that the sails of Henry's little fleet were furled in the harbour of Milford Haven. They had accomplished the passage from Harfleur in seven days. The soldiers landed with promptitude, in the neighbourhood of the village of Dale, on the western side of the bay, and there encamped for the night. At sunrise the next morning they removed to Haverfordwest, a march of something less than ten miles. Here, reinforced by the men of Pembrokeshire, they proceeded to Cardigan, where they were joined by forces under Richard Griffith and John Morgan. Crossing the Severn, they entered Shrewsbury, where they were again augmented by a goodly band of Welshmen under Rice ap Thomas. The night before they entered the town, the army was encamped on Forton or Fortune Heath (to the west of Shrewsbury, near the river). They then marched to Newport, and the earl pitched his camp on a little hill adjoining, where he stopped a night. Here he was joined by the power of the young Earl of Shrewsbury, under George Talbot. He next halted at the town of Stafford, and thence marched on Lichfield, where his army bivouacked outside the walls. From this place they removed to Tamworth, their last halting-place before the great battle which decided the fate of England, and placed her crown on Henry's brow.

Three weeks were occupied in the march, and their road lay chiefly through a mountainous country, not, as far as we are aware, more likely to give origin to malarious influence than other parts of the island. Yet the halt of the army at Shrewsbury, the place at which the last outbreak of the "gret dethe and hasty" undoubtedly commenced; the passage of the river Severn, which in the year 1483, overflowing its banks, had inundated the whole of the surrounding country; and the encampment on the low marshy ground outside the walls of the city of Lichfield, are especially worthy of remark.

Fortune and victory sat on Henry's helm. Disbanding his army, he advanced by easy stages to London, greeted as he went by the acclamations of the populace. All things seemed to promise a

> "harvest of perpetual peace,
> By this one bloody trial of sharp war",

when "sodenly", to use the graphic words of an old chronicler, "a newe kynde of sicknes came through the whole region, which was so sore, so peynfull, and sharp, that the lyke was neuer harde of to any mannes remembraunce before that tyme:

For sodenly a dedly and burnyng sweate inuaded their bodyes and vexed their bloud with a most ardent heat, infested the stomack and the head greuously: by the tormentyng and vexacion of which sicknes, men were so sore handled and so painfully pangued that if they were layed in their bed, beyng not hable to suffre the importunate heat, they cast away the shetes and all the clothes liyng on the bed. If they were in their apparell and vestures, they would put of all their garmentes, euen to their shirtes. Other were so drye that they dranke the colde water to quenche their importune heate and insaciable thirst. Other that could or at the least woulde abyde the heate and styntche (for in dede the sweate had a great and a strong sauoure) caused clothes to be layed upon theim asmuch as they coulde beare, to dryue oute the sweate if it might be. All in maner assone as the sweate toke them, or within a short space after, yelded vp their ghost. So that of all them that sickened ther was not one emongest an hundreth that escaped."

Consternation and affright reigned everywhere. "Some", says Caius, were "immediatly killed in opening theire windowes, some in plaieng with children in their strete dores, some in one hour, many in two it destroyed, and at the longest, to them that merilye dined, it gaue a sorowful Supper. As it founde them so it toke them, some in sleape some in wake, some in mirthe some in care, some fasting and some ful, some busy and some idle, and in one house sometyme three sometyme fiue, sometyme seuen sometyme eyght, sometyme more sometyme all, of the whyche, if the haulfe in euerye Towne escaped, it was thoughte great fauour." Numbers were seen rushing from their houses in a state of nudity, hoping to cool their burning torments. The general joy which the victory of Bosworth had inspired was changed into despondence and evil augury. With grim humour, the people exclaimed that the new reign must needs be one of labour, since it began with a sickness of sweat.

It was about the end of the month of August that the disease appeared at Oxford. Here, according to Anthony-à-Wood, it raged with violence for the space of six weeks, killing most of the students, or banishing them from the university. It would seem that it did not reach London until some days later. Several chroniclers state that the 21st of September was the date of its outbreak; yet, as Hecker suggests, it is probable that cases may have occurred before that time, although its virulence was not until then manifested. However this may be, it continued in the city until towards the end of October, but had sufficiently subsided to permit the coronation of Henry on

the 30th of that month. During the time that the epidemic was at its height, the mortality was prodigious. On the 11th of October, the mayor, Thomas Hill, died; he was succeeded by Sir William Stokker, knight, who before eight days was also carried off. It was also fatal to several of the aldermen. Grafton says six; Stow enumerates four. The higher classes could claim no immunity from the common enemy. Many of the aristocracy, both secular and clerical, fell its victims. It is noticeable that this was the case in each succeeding epidemic.

From London and the eastern part of the kingdom, it spread to the western and southern districts, and did not wholly disappear until December. In this time it had invaded almost the whole kingdom—every town and village, says Grafton—but without crossing the Scottish border, or being conveyed to the sister kingdom of Ireland.

From the Croyland Annals, we learn that it carried off the excellent Abbot Lambert Fossdyke, after eighteen hours sickness. This is stated to have taken place on the 14th of November, although the writer in another place alters the date to the 14th of October; and we think the latter more probable, as, whilst we do not deny that the disease lingered, as Wood says, in some places until December, we should be inclined to suppose that the fury of the epidemic had in November and December partially subsided, and deaths consequently become rare. To this circumstance we are inclined in some degree to attribute the efficacy ascribed to the Anglican mode of treatment. But on this point we hope to touch hereafter.

Facts are wanting to give a minute topographical or numerical account of its ravages. Baines says that it prevailed in Lancashire; but he furnishes no particulars. We can only infer from general testimony the universality and magnitude of the evil. Its disappearance may have been consummated by a violent storm of wind, which prevailed on the 1st of the following January. For twenty-one years from this date, we read no more in English annals of a return of the "fereful tyme of the sweate."*

The kingdom was only recovering from the tremendous invasion of plague, which in 1499 carried off, it is said, in London alone 30,000 persons, and cessation from civil contention and foreign warfare promised increase and prosperity to her population, when, in the summer of 1506, the old enemy again started into existence. This epidemic appears generally to have been of a milder type, and deaths were in most places

* In 1491 and 92, a sweating plague is said to have prevailed in Ireland; according to the Annals of the Four Masters, its attack was of twenty-four hours duration. Ware says, but we know not on what authority, that it was brought out of England. (See Census of Ireland for the year 1851.)

unfrequent. We know little as to its origin or spread. As in the close of the first epidemic, the lessened mortality was ascribed rather to the effects of treatment than to any temporary diminution in the virulence of the disorder. One record has come down to us, which is sufficient of itself to show that, under favouring circumstances, the "new acquaintance" of 1506 was capable of being developed in all its ancient severity. In the Annals of Chester (Harl. MSS. No. 2125), we are told that in 1506 there died in one day, of the sweating sickness, three score and eleven householders, of whom only four or five were women. Another account says, that in three days there died ninety-one householders, four only being widows. It matters not which is correct; either is sufficient to prove that no real change had occurred in the nature of the sweating sickness. It lingered until the autumn, and then disappeared. Lysons and Hemmingways make the outbreak at Chester to have occurred in 1507; but Pennant, more correctly, as it appears to us, follows the date of 1506, given in the Chester Annals.

Eleven years elapsed, the crafty Richmond slept the sleep of death in the "sumpteous and solempne chapell which he had caused to be buylded", and his son reigned in his stead. Unexpectedly, in July 1517, the pestilence again raised its head. We believe that this sweat was the most fatal in its results of any of the series. The dismal scenes of the first epidemic were repeated. It "killed some within three hours", say the chroniclers, "some within two hours, some merry at dinner and dead at supper." "In some one town half the people died, in some other town the third part, the sweat was so fervent and the infection so great."

We learn incidentally, from a letter written by the Cardinal du Bellay, who was ambassador from France to Henry VIII, and himself a sufferer in the next epidemic of 1528, that it was estimated that 10,000 persons died in ten or twelve days. The context warrants us in the supposition that reference is made here to the metropolis alone. Taking this as a mere approximation, we shall at once see, by comparing it with the ravages of other epidemics, how frightful the mortality whilst it lasted was. In 1854, the total number of deaths from cholera and diarrhœa in London, extending over a period of six months, with a population of 2,517,048, was 14,806. The epidemic was at its height during the first fourteen days of September, when 4,371 persons were carried off. The mortality in the epidemic of 1849 was somewhat greater, viz. 18,036, the period again extending over several months. Even in the great plague year, 1665, when 68,590 persons died in London, and the city

was nearly abandoned, the mortality never rose higher than 7,165 in a week; this number being reached in the third week of September. The population of the metropolis in 1676, is estimated in Graunt's Bills of Mortality at 384,000; consequently, in the year 1517, it must have fallen far short of 300,000. Making every allowance for exaggeration, supposing only one-half the number stated to have died in the time specified, the mortality for that time, taking into account the amount of population, must have been as great as in the worst irruption of bubo plague, and so appalling that, in the present day, we can form but a faint idea of it.

Rich and poor were equally victims. Rank claimed for its possessor no exemption; poverty was no shield. The deserted palace no longer echoed the sounds of mirth; the low wail of the mourner interrupted the silence of the streets. Henry VIII, a prince who, like Leviathan in the deep, seemed to consider the earth as merely formed to take his pastime therein, leaving the city, retreated with a few followers from place to place before the advancing waves of pestilence. His Court had been the seat of its triumphs. His private secretary, the learned Italian, Ammonius of Lucca, died a few hours after he had boasted to Sir Thomas More that by abstinence and regimen he had shielded himself and family. The Lord Grey of Wilton, the Lord Clinton, and many other of his knights, gentlemen, and officers, were no more. Michaelmas and Christmas passed without their usual festivities. No gathering of people was permitted, for fear of infection. Oxford and Cambridge, crowded with eager students, amongst whom were already germinating seeds which produced the Reformation, were again attacked, and the former was again deserted. The sweat continued until the middle of December; and its horrors were heightened by the supervention towards the winter of plague. In Chester the mortality from the combined diseases was so great, that grass grew a foot high at the town cross. England, again, with one remarkable exception, was *alone* the land of the shadow of death. The pestilence passed over to the town of Calais, at that period belonging to the British Crown. But here it is said to have attacked principally the English inhabitants; and we know that it not only did not spread through France, but (from a reliable source) that it did not even reach to Graveling.

It must have been during one of these earlier irruptions of the sweating disease, that a Latin prayer was composed, of which a copy has been preserved. It is addressed "ad beatum Henricum," either Henry the Emperor, who with his wife Cunegunde, were saints of the Romish calendar, or Henry VI.

of that name is intended, who was claimed as uncle by Henry VII., and who, his piety having nearly procured him canonization, was highly revered by the people. In it occurs the petition so characteristic of the period:—

"Non sudore,
Vel dolore,
Moriamur subito."

The whole is to be found in the *Gent. Mag.* for 1786, p. 747.

1528. We have now arrived at the fourth irruption of the disease, and fortunately can present a more detailed account of the historical facts connected with it, than we have been enabled to do whilst glancing at the three former epidemics. In this we shall necessarily correct a slight error into which Professor Hecker, from the paucity of his materials, has fallen. Although the mortality was not equal in magnitude to that of 1517, yet the influence was widely felt, the disease was distinguished by the same characteristics, and the deaths were quite numerous enough to be placed in comparison with those occurring in ordinary epidemic visitations. From the circumstance that the disease was again particularly rife in the Court, we have found many references to it in letters published under the Royal Commission in the "State Papers," and in similar collections. We propose illustrating our account with such extracts from these as may serve to bring before the reader a more definite picture of the prevailing state of things.

Hecker, following Grafton, states that the disease first appeared towards the end of May, in the most populous part of the city of London. This was not the case. Before its influence was felt in the capital, which was not until the 14th of June, it had been rife in the north. For Sir William Parre, writing to Wolsey, on the 31st of May, informs him that the Duke of Richmond had on account of its prevalence removed to Ledeston, in Yorkshire, three miles from Pontefract. It was brought out of Sussex into London, as we learn incidentally from an unpublished letter in the Cottonian Collection. We may therefore conclude that it had widely spread in the country districts during the latter part of May and the first weeks of June. Oxford, as usual, suffered severely. The rapidity with which it flew from district to district, and from town to town, obtained for it in 1551, the quaint name of the "posting sweat." A most graphic picture of the commencement of the epidemic in the metropolis, is given by the Cardinal du Bellay. We are indebted to Mr. Halliwell for the publication of this most interesting document, which forms part of the treasures contained in the Imperial Library of Paris. From it we shall now give

our readers some extracts. The Cardinal's letter is dated London, June 18, 1528; he writes:—

"One of the filles de chambre of Mademoiselle de Boulen was attacked on Tuesday by the sweating sickness. The king left in great haste, and went a dozen miles off: but it is denied that the lady Anne Boleyn was sent away as suspected, to her brother the Viscount, who is in Kent. This disease, which broke out here four days ago, is the easiest in the world to die of. You have a slight pain in the head, and at the heart; all at once you begin to sweat. There is no need for a physician; for if you uncover yourself the least in the world, or cover yourself a little too much, you are taken off without languishing, as those dreadful fevers make you do. But it is no great thing, for during the time specified, about two thousand only have been attacked by it in London. Yesterday, having gone to swear the truce, they might be seen, as thick as flies, hurrying out of the streets and the shops into the houses, to take the sweat the instant they were seized by the distemper. I found the ambassador of Milan leaving his quarters in great haste, because two or three had been attacked by it."

* * * * *

"But to return to London. I assure you that the priests there have a better time of it than the physicians, except that there is not enough of them to bury the dead. If the thing lasts, corn will be cheap. Twelve years ago, when the same thing happened, 10,000 persons died in ten or twelve days, it is said, but it was not so sharp as it is now beginning to be. M. the legate (Cardinal Wolsey), had come for the term; but he soon had his horses saddled again, and there will be neither assignation nor term. Everybody is terribly alarmed." This is confirmed by Stow. The term was adjourned to Michaelmas.

From this account we see that at its first onset in London it seemed probable that the epidemic would be as fatal as its predecessor. This expectation was not realized. The mortality seems to have been unequal at different times during the same visitation. It did not gradually increase, as in the plague, to its maximum, and then as gradually diminish, but probably was never more fatal than at its first onset.

Henry's first retreat was Waltham in Essex, from which however he was speedily driven, by the seizure of the treasurer, two of the court ushers, and two of his valets de chambre. He immediately retired to Hunsdon in Hertfordshire, where he arrived on the 21st of June. News here reached him that Anne Boleyn, who had already become the object of his passion, was attacked by the disease. The occasion of this illness produced one of that re-

markable series of love-letters, which have since become so celebrated, and the originals of which are preserved at Rome. In it he deplores her illness, states he would gladly bear half of it to have her cured, and regrets that he cannot send her his first physician, who was absent, but that in default of him he sends the second, "and the only one left, praying God that he may soon make you well, and then I shall love him more than ever." Happy indeed would it have been for the ill-fated Anne had the dart penetrated more deeply. The scene enacted in the "doleful prison in the Tower", on the 19th of May, 1536, would not then have disgraced the history of the English monarchy, and the escutcheon of the Tudor would have been spared one of its deepest stains!

The next document of any importance, in which we find reference to our subject, is a letter written by Brian (afterwards Sir Brian Tuke) to Cardinal Wolsey; and, risking the charge of prolixity, we cannot refrain from extracting from it a passage or two, as it exhibited bluff King Hal in the novel character of a medical adviser. Tuke dates from Hunsdon, June 23rd, 1528; and, in relating to Wolsey the particulars of a private interview he had with the King, respecting a letter he had received from the Cardinal, he thus writes:—"I red forthe til it camme to the latter ende, mencionyng Your Graces good comfort and counsail geven to His Highnes, for avoiding this infeccion, for the whiche the same, with a most cordial maner, thanked Your Grace: and shewing me, firste, a great proces of the maner of that infeccion; howe folkes wer taken; howe litel dangeir was in it, if good ordre be observed; howe fewe wer ded of it; howe Mastres Anne, and my Lorde of Rocheforde, bothe have had it; what jeopardie they have ben in, by retournyng in of the swet bifore the tyme; of the endevour of Mr. Buttes who hathe ben with them, and is retourned; with many other thinges touching those matiers, and finally of their perfite recovery; His Highnes willed me to write unto Your Grace, most hertily desiring the same, above al other thinges, to kepe Your Grace oute of al ayre, where any of that infeccion is, and that if, in on place any on fal sike thereof, that Your Grace incontinently do remove to a clene place; and so, in like cace, from that place to an other, and with a small and clene company: saying, that this is the thing, whereby His Highnes hathe pourged his house, having the same nowe, thanked be God, clene. And over that, His Highnes desireth Your Grace to use smal sowpers, and to drink litel wyne, namely that is big, and ons in the weke to use the pilles of Rasis; and if it comme in any wise, to swete moderately the

ful tyme, without suffering it to renne in; whiche by Your Graces phisicians, with a possetale, having certein herbes clarified in it, shal facilly, if nede be, be provoked and contynued; with more good holsom counsail by His Highnes in most tender and loving maner geven to Your Grace, then my symple wit can suffise to reherse; whiche his gracious commaundement, I said, I wolde accomplish accordingly."

In the after part of his letter he informs the Cardinal that news had just arrived that Mr. Cary, whom he had shortly before met on his way to hunt, was "ded of the swet." "Our Lorde have mercy on his soule, and holde his hande over us." Proposing to join Wolsey, he tells him he dare not come through London, "wherfore I wol cost to the water side, and comme the rest by water, thorough London Bridge; though I promyse Your Grace there is non erthely riches shoulde cause me to travaile muche nowe, considering that the phisicians tel me ther is nothing, that more stirreth the mater and cause of the swet then moche traveil, and likewise commyng in the son."

In the city the ancient solempity of the procession of the watch, on Midsummer eve, was discontinued, for fear of adding fuel to the spreading flame by collecting the populace: whilst the King removed to Hertford, at which place he was "moche troubled," for on the night of the 26th, there fell sick the Marquess and Marchioness of Dorset, Sir Thomas Cheney, Mistress Croke, Master Norris, and Master Wallop; who all, however, recovered; and Sir Francis Poyntz, who, says the writer of the letter we are quoting, "is departed, whiche Jhesu pardon." On these occurrences taking place, the King fled to Bishop's Hatfield in Hertfordshire.

On the 29th, we find Wolsey removing to Hampton Court, on account of the "vehement infection and sykenes, that ys fallen amonges his Graces folkes." Du Bellay's next letter, we shall see, gives a rather ludicrous account of the precipitate retreat of the "great child of honour," who, as all know from Cavendish, was dreadfully afraid of contagion, and used to carry with him an orange, stuffed with sponge steeped in vinegar and confections, against pestilent airs, the which he commonly held to his nose when he came to the presses, or when he was pestered with many suitors.

On the 30th the King had reached Tittenhanger in Hertfordshire, and here received news of the death of Sir William Compton, who was reported to be "lost by neclygens, in lettyng hym slepe in the begynnyng of his swete." No more on that day had been attacked in the Court, and those who had sickened on the 28th were recovered.

Grafton tells us that during the stay at Tittenhanger the place was daily purged with fires and other preservatives. An odd remedy against a sweating sickness at Midsummer!

The second letter of the Cardinal du Bellay is of this date; after recounting the names of nine courtiers who had been attacked, and of three who were dead, he says—"but when all is said, those who do not expose themselves to the air rarely die; so that out of more than 45,000 who have been attacked in London, not 2000 have died, whatever people may say. It is true that if you merely put your hand out of bed during the twenty-four hours, you instantly become stiff as a peacock. P.S. Since writing my letters, I have been informed that a brother of the Earl of Derby's, and a son-in-law of the Duke of Norfolk's, have died suddenly at the legate's (Wolsey), who slipped out at the back door with a few servants, and would not let any body know whither he was going, that he might not be followed. The king at last stopped about twenty miles hence, at a house which M. the legate has had built, and I have it from good authority, that he has made his will and taken the sacrament, for fear of sudden seizure. Nothing ails him, thank God!"

We shall hereafter see that the ambassador was inclined to think more seriously of it, when he had himself been a sufferer, and was the only survivor of nineteen who were attacked. However, in the absence of other evidence, we are bound to receive his statement as correct, in reference to the amount of mortality. And even this must have been proportionally as great as in our last epidemic of cholera and diarrhœa. It is calculated, in the Report of the Scientific Committee, published by the Board of Health, that seventy-one deaths in each 10,000 of the population of London took place, and that in this number there were 3473 cases of all forms of cholera and diarrhœa; in other words, that there was one death to every forty-eight attacks. But Du Bellay's statement gives an average of two deaths in forty-five seizures; or more than double the proportion. Again, it must be remembered that these occurred in the space of sixteen days, whereas the cholera epidemic lasted six months. We do not wish to be supposed to insist on this calculation; in either case it can merely be an approximation, and we advance it here only to show that even a mild epidemic of the sweating sickness was no slight pestilence.

On the first of July, we are informed that two cases had occurred at Tittenhanger; one being that of a gentleman's servant, the other, one of the King's wardrobe. On this day

the King sends to Wolsey for "the byll that Mr. Fynche made, for the remedy of all suche as have fallyn syke in youre howse; for as His Hynes ys enformyd, he haythe doyne very well, boythe to bryng them to there swheyte ageine, when they fall owte, and allso to swayge the grete hete and burnyng."

On the 5th, we find the King again despatching to Wolsey to delay visiting him "untill the tyme be more propiciouse." In a former letter we learn that flying tales had reached Tittenhanger, that many of his Grace's folks were sick, and divers departed. Henry was as much frightened as the Cardinal, although on St. Thomas's day he sends him a message, in a letter written by Dr. Bell, to put away fear and fantasies, to commit all to God, and expresses a wish that "Your Grace's harte weer as gode as hys is." Both king and minister made their wills, and each took care that the assurance was conveyed to the other that he was not forgotten in the testament. In the letter of the 5th, the Cardinal is desired to "cawse generall processions to be made, unyversally thorough the realme, aswell for the good wetheringes, to thencrease of corne and fruyte, as also for the plage that now reignethe."

On the 9th, we find Henry preparing to remove from Tittenhanger to Ampthill in Bedfordshire, in consequence of the seizure of the "Lady Marques of Exeter," and commanding that all such as were with the Marquis and Marchioness should "departe in severall parcells, and so not contynue together."

On the 10th, the king had postponed his departure until the 11th; but, in the meantime, eight or nine had fallen sick, although none had been in jeopardy. The unpublished letter in the Cottonian Collection, before alluded to, bears date July the 14th. It is from Brian Tuke to Sir Peter Vannes. The disease had broken out in Tuke's house; and he says, "I write this at my waking after mydnyȝt, fearing to lye stil for the swet, with an aking and troubled hed." His wife had passed the paroxysm, but "veray weke," "and also sore broken oute about her mowthe and other places." His letter is principally filled with his opinion as to the causes and mode of spread of the epidemic. He allows that there is an infection, but believes that the disease is chiefly "provoked of disposicion of the tyme." He thinks that many frighten themselves into it. (How commonly we heard this in the late epidemics!) He flatters himself that he has obtained protection by the nightly use of a certain means; which, however he does not specify. The context would lead us to suppose that it was the application of cold in some form; for he says—"It wer to long a worke to declare unto you by what and howe I nyghtly put

away the swet from me, and by what reason I dare do the same, when al other men take that so doing they kil them self." The chief facts of interest we learn from this letter are, that the sweat did not spread from Calais to Graveling, although there was constant intercourse between the two places, and that it was brought from Sussex into London. We may form some idea of his pathology by the following: "It is not so moch to be doubted to put away the swet in the begynnyng, and bifore a man's grese be well hote, keping molten, as it is taken. For though surely after the grese so heted it is no lesse but rather more danger for a man to take colde then it wer for an horse that in like case is destroyed."

On the 18th, the Abbess of Wilton in Wiltshire writes to Wolsey, that "it pleasithe Almyghty God to visite nowe the monastery with this greate plage of swetyng."

The French ambassador's third letter bears date the 21st, and from it we shall make our last extracts in reference to this visitation. He says: "As to the danger which is in this country, it begins to diminish hereabouts, but increases in parts where it had not been. In Kent it is rife at this moment." * * "The day that I had it at M. de Canterbury's (the archbishop), eighteen died of it in four hours; scarcely any escaped that day but myself, and I am not yet stout. The king has removed further than he was, and hopes that he shall not have the complaint. Still he keeps upon his guard, confesses every day, receives the sacrament on all holidays; and likewise the queen, who is with him. M. the legate does the same. The notaries have a fine time of it here: I believe there have been made a hundred thousand wills off hand, because those who died all went mad the instant the disorder became severe. The astrologers say this will turn to the Plague, but I think they rave."

The epidemic spread throughout the country, and in consequence of it the circuits of assize were adjourned. Ireland also now unquestionably felt its influence. In Cork it was very fatal; and in Dublin, in the month of August, the archbishop and many of the citizens fell victims. It continued in some parts of England until the autumn; for Magnus, writing to Wolsey from Sheriff Hutton in Yorkshire, on the 7th of October, says that in consequence of the "pestiferous and ragious swete," the Duke of Richmond has remained until now in a private place, with few attendants.

We must apologize to our readers for these lengthy details; but it is in descending to particulars we frequently can obtain that vivid impression of bygone events, which a mere general statement so often fails to convey.

In the following year, 1529, the sweating fever appeared at Hamburg, and spread throughout Germany, the Netherlands, Denmark, Sweden, and Norway. It is not within the limits of a historical paper, which is confined to an account of the sweating sickness in England, to trace the march of the pestilence. This has been most ably performed by Hecker. Wherever it appeared it was accompanied, as usual, by dread, death, and desolation. We cannot, however, agree with the German professor in his view of the production of the epidemic. We are inclined to avow ourselves contagionists, in a modified sense of the word. It is beyond doubt that the disease did not appear at Hamburg until, on the 25th of July, a ship arrived *from England*, commanded by a Captain Hermann Evers, on board which, several cases of sweating sickness had occurred. On the night of their landing four persons were attacked and died. It is true that the conflagration no longer spread widely in England, but it had not died out in the earlier part of the preceding winter, and we cannot but believe that its flickering embers still existed. Sporadic cases doubtless occurred, and even isolated outbreaks of the disease. At least, we have strong proof of one such taking place at Chester, in 1550, a year before the last great epidemic.* Hecker seems to think that the passengers on board Captain Evers's ship, acquired the sweat in the fogs of the German Ocean. But other ships must have been exposed to the same influence, and this was an isolated case. When, we would inquire, did a similar epidemic commence among the colliers of the Tyne, or the fishers of the Forth? The argument that he adduces from the fact that no sooner did report of the disease reach a place, than cases immediately occurred; and that, therefore, it spread more rapidly than by contagion, is the same advanced by our old friend, Brian Tuke, who says—"For when an hole man hath comen from London, and shewed of the swet, the same ny3t al the toun, where the knowlege was, fal of it, and thus it spredeth yet as the fame roneth." What better proof of the intervention of human intercourse can we have than is given in this sentence? The solution of the problem lies in the "whole man who came from London." Evidently the rumour and the reality flew along the same conducting wire.

* A remarkable notice of the occurrence of the sweat in the town of Galway, in the year 1513, is given by Mr. Hardiman in his local history. The fact was obtained from "Town Annals", no longer accessible. We can only class it, as an isolated outbreak, with that of Chester in 1550. (Census of Ireland, 1851.)

Yet we would not insist too much on what after all must be matter of opinion. When we find the medical world of our own day so divided on the subjects of the spread of cholera and yellow fever, the facts of which appeal to their immediate observation, how can we hope to draw conclusions with certainty from the scant records of 300 years ago—at the best, but a faint glimmer to direct us through the darkness which surrounds the past? That an outbreak of the sweat occurred at Chester in the year 1550, is affirmed by all the local historians. The year seems fixed by the fact that the mayor, Edmund Gee, died of it. We have examined several lists of the mayors and sheriffs, both manuscript and printed; and they each place his mayoralty and death in the year 1550. The Chester Chronicles, in the Harleian Collection, state that in the morning he left the pentice (a local court) in good health, and that he died before night. Forty persons are said to have been carried off in twenty-four hours. Of course we cannot positively declare that there has been no confusion of dates here; we only lay before our readers the unanimous testimony of the Chester authorities.*

We have now arrived at the fifth and last act of the tragedy. The final irruption of the sweating sickness commenced at Shrewsbury, in the year 1551, the fifth of the short but eventful reign of Edward VI. Caius and Stow name the 15th of April as the day of its first appearance, but a manuscript chronicle of the town dates its commencement from the 22nd of March. Local tradition yet points to the White Horse Shut, Frankwell, as the focus from which the malady spread. Hecker, without sufficient ground, places the amount of mortality at 960. But Caius, whom he follows, merely states that in one city (*una civitate*) that number died. We are inclined to doubt, with the authors of the History of Shrewsbury, whether, as has been generally affirmed, Caius was present in that town at all. When he says, "Ipse dum hæc tragedia agebatur, presens spectator interfui," he only states that he was an eye-witness of the dreary spectacle; and

* The manuscript above quoted, making the last Chester outbreak to have occurred in 1550, places the first in 1506. If we believe these annals to be incorrectly dated by a year, in that case the true date of the earlier visitation will be 1507, as given by several writers. The affirmation of Caius, that the disease appeared at Westchester (the old name for Chester) in 1551, favours this assumption. On the other hand, the Vale Royal, Ormerod, Hemingways and Lysons all agree in stating that 1550 was the year in which the town was severely visited by the malady. Whichever view we take, it would appear that one of the Chester visitations must have occurred in a year (1507 or 1550) not marked by a general epidemic, unless we gratuitously fix a charge of incorrectness on the early local annalists.

there are reasons which render it more probable that he observed it in London than at Shrewsbury. However this may be, we have his testimony that it spread from its place of origin to Ludlow, Presteign, and other places in Wales, thence to Westchester, Coventry, Drenfoorde (?), and the south, before it came to London, which it reached on the 7th of July, three months after its first appearance. He gives a most vivid description of the consternation, horror, and desolation that reigned. Business was at an end; citizens fled to the country; peasants thronged the towns; many sought an asylum in foreign lands. The shrieks of women, rushing half naked from their habitations, mingled with the groans of the dying, and the deep clang of the funeral bell, booming through the misty air from every tower and steeple, deafened the ear, and struck terror to the heart of the passer. The epidemic was at its height in the capital from the 9th to the 19th of July, and it lingered until the 30th. In this time, at the lowest computation, nearly a thousand people perished. The exact number is somewhat differently stated, Stow says 960 died, of whom 800 in the first week. Caius (English treatise) reports that 761 died from the 9th to the 16th, besides those on the 7th and 8th, of whom no register was kept, and 142 from the 16th to the 30th. Machyn, a citizen resident in London, says that 872 were certified by the chancellor to have perished from the 8th to the 19th; whilst, in a manuscript in the Harleian Collection, we are told that 938 persons were carried off between the 7th and 20th. These numbers render it probable that when Caius, in his Latin treatise, written some time after, speaks of 960 dying in one city, his statement refers to the metropolis. One testimony, however, places the mortality much higher. Christopher Froschover, in a letter, dated London, August the 12th, affirms that 2,000 had died in the city, and 200 at Cambridge. The short space of time occupied by the pestilence, with the awfully abrupt seizure, and speedy termination of the fatal cases, rendered the destruction so appalling. It was the "sudden death," with battle and murder equally dreaded.

Again the palace was attacked. A celebrated lawyer, Sir Thomas Speke, was seized there, and had only time to reach his house in Chancery Lane, before he breathed his last. There were some dancing in the Court at nine o'clock, who were dead at eleven, says a sermon of the period. There died in London, writes Machyn, "mony marchants and grett ryche men and women, and yonge men." Howes, in his continuation of Stow, relates that "seven honest householders did sup toge-

ther, and before eight of the clock the next morning six of them were dead." The young king fled to Hampton Court, whence he addressed a letter to the bishops, inciting them to persuade the people to prayer, and to see God better served. There are several references to the malady in the preaching of Bradford and Hooper: the latter made it the subject of a pastoral charge and homily.

We are unable to trace the pestilence from town to town, but sufficient data have been collected to shew how widely the destructive principle was disseminated. In June we find it at Loughborough, in Leicestershire. In the parish register is the curious entry: "1551, June. The swat, called New acquaintance, alias Stoupe knave and know thy master, began on the 24th of this month." It was in July that the disease appeared at Cambridge. Pursuing their studies in the University, were the young Duke of Suffolk, and his brother, Charles Brandon, equally distinguished for ability, worth, and learning. Alarmed by the outbreak, they hastened, with a few attendants, to Kingston, five miles distant. Here their chosen friend and companion, Charles Stanley, was seized, and expired in ten hours. In sorrow and consternation the brothers fled to the Bishop of Lincoln's palace at Bugden, in Huntingdon, where they were joined, late at night, by their mother. Scarcely had she embraced them, when the Duke was attacked by the fatal symptoms, and in five hours, despite the endeavours of physicans, ceased to breathe. Within half an hour the younger brother, who slept in a distant part of the palace, was also a corpse. Their deaths created universal sorrow, the more, perhaps, that, through the influence of their mother, they were known to be attached to the principles of the Reformation. Our account is extracted from the very rare and interesting black-letter tract by Sir Thomas Wilson.

Late in July the pestilence was at Gloucester, whence Bishop Hooper, in a letter, dated August 1st, writes: "After I had begun this letter, my wife, and five others of my chaplains and domestics, were attacked by a new kind of sweating sickness, and were in great danger for twenty-four hours. I myself have but recently recovered from the same. The infection of this disease is in England most severe." At Bristol the mortality was great. It lasted from Easter to Michaelmas, and several hundreds are said to have been carried off every week. Small towns and villages equally felt the influence. The parish register of Uffculme, in Devonshire, records that of thirty-eight deaths occurring in 1551, twenty-seven were in the first eleven days of August, and sixteen of them in three days. These persons

are said to have died of the "hote sickness or stup gallant." (This latter name is evidently derived from the *Trousse Galant* of the French, a disease which had been epidemic in France in 1528, and afterwards, and which, we would suggest, was allied to the worst form of scarlatina.)*

Whilst the south thus suffered, the north could offer no asylum. In York and Hull the pestilence was severely felt. It ravaged Lancashire; one parish register gives us the dates and number of deaths. In Ulverstone parish there were five buried on the 17th, two on the 18th, four on the 19th, eleven on the 20th, six on the 21st, six on the 22nd, two on the 23rd, and three on the 24th of August. On the 7th of that month we find it in the neighbourhood of Leeds. Whitaker quotes that "on the 7th of August, 1551, the sweating sickness was so vehement in Liversage, that Sir John Neville was departed from Liversage Hall to his house at Hunslet, for fear thereof. It speedily despatched such as were infected; for one William Rayner, the same day he died, had been abroad with his hawk."

The disease did not disappear till the end of September. Several of the most distinguished men of the age fell its victims, as we learn in a letter from Roger Ascham to Sir William Cecil. In Catholic countries the sad fate of England was held a judgment on her departure from the Romish faith. At home it roused that spirit of piety and benevolence, which is never wanting in the Anglo-Saxon race in the time of suffering and distress. The religious fervour of the period burned higher in the gale; and, no doubt, amid the terrors of the sweating sickness, many acquired that trust in Providence and fearlessness of death, which were in the ensuing religious troubles to be so severely tried. On the other hand, amongst the masses, as Grafton drily observes, "As the disease ceased, so the devotion quickly decayed."

From this time the Sudor Britannicus has never reappeared in its epidemic form. In one or two instances, we have seen isolated notices of death occurring from sweating sickness. But we have no means of judging the nature of the disease referred to under that name, or of determining the credibility of the statement. One thing is certain: no large district of our island has ever been ravaged by its indigenous pestilence, since the memorable year in which the destroying angel alighted on the sedgy banks of the gentle Severn.

Francis C. Webb.

* It was a fatal inflammatory fever, followed in the survivors by loss of hair and nails, and dropsical effusions.

DISEASED FOOD AND DISEASE.*

In the first number of this REVIEW we introduced to the notice of the public the results which had been arrived at by M. Soumille, of Avignon, regarding the characters and effects of deceased animal food. At that time but little was heard in England on these important questions, but within the last four months there has been an entire revolution, and now the subject is literally and practically in everybody's mouth. A variety of circumstances have led to this change of feeling. The first noteworthy facts consisted in the promulgation of the modern views as to the origin of diseases of the entozoic class, from the consumption of improper animal food. Then came a report on diseased food, by the Association of Medical Officers of Health. Then came news of a cattle murrain on the continent—then rumour of a cattle murrain here—then vague notions of human plagues, of a great or insidious kind, springing out of dinners eaten in the bliss of ignorance. These rumours, and rumours of rumours, are ever the forerunners of the seasons which string up communities to the listenings of their destinies. These are the birthdays of prophets and thunder mortals, in which, whoever enjoys the sight of a general kneeshaking, may fill himself with fun to the brim. Blow the trumpet loud and fierce:—give it double utterance, give it shake, give it extreme modulation, make it curse, make it warn, make it threaten, make it whisper, make it sigh, make it spit, give its sounds echoes, give the echoes encouragement! and oh! great artist, with your lips at the instrument, whether your music be the music of Solon, or of Francis Moore, physician, depend on it, you will get an audience, and an attentive ear.

When the time was ripe for the event, and a declaiming seer was publicly required to pronounce anathema on fever cows, Mr. Gamgee put on the garb of Hygienic high priest. In this imposing figure he did what no high priest has done before. He took the trumpet we have spoken of, and blew it

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* Report on Murrain in Horned Cattle; the Public Sale of Diseased Animals; and the Effects of the Consumption of their Flesh on Human Health. By E. HEADLAM GREENHOW, M.D. Blue Book. London: 1857.

Two Letters to the Right Hon. Sir George Grey, on the Cattle Plague and Diseased Meat in their Relations with Public Health and the Interests of Agriculture. By JOSEPH S. GAMGEE. London: Richards. 1857.

Reports on the Relations of Food and Disease. *Medical Times and Gazette* for 1857, Nos. 354, 355, 356, 357, 358, 360. London: Churchill.

Letter on the Apprehended Murrain. By JOHN N. RADCLIFFE. *Leeds Mercury*, April 28th, 1857.

Various Letters in the *Times* newspaper on Murrain. 1857.

so terrifically, that, from 37 Great Queen Street, its noise reached the Hebrides. He made it shake, curse, warn, sigh, whisper, spit, and threaten. Never, since the days of Vespasian, and of the son of Ananus, was there such an executive or dismal scream. Woe, woe to the shambles! woe to Islington Market! woe to Mr. Nice, who winks at the nasty! woe to Mr. Pocklington! woe, woe to Newgate! woe to Mr. Fisher! woe, woe, woe to the Veterinary College! woe to fever cows! woe to the New Cattle Market! and woe to the Home Secretary himself, if he listen not to the trumpet—if he listen not to the trumpet!

Then come the echoes: the diseased meat question is suddenly exalted into the great sanitary question of the day: the cook is torn from her butcher: and butchers in general become poetical and remonstrative.

"Gin a body meet a body,
In a typhus state;
Gin a body kill a body,
Need a body eat?"

Old maidens go in for a general fast—old gentleman go out to select their own viands. Several charitable institutions put off their dinners: the lord mayor and aldermen pass weepingly over to the vegetarians: the awful conflagration tobacco clamour ends in smoke, and out of its ashes the Phœnix rises whose muscle is of beef and whose liver is of mutton.

The press expounds. The *Times* has an eruption of letters. The *Medical Times and Gazette* takes on emetic virtues. With the coolness of the giant warrior chained to the North Pole, and wanting altogether in the finer sympathies and more exquisite sentiments, this ruthless periodical writes down statements which are well calculated to turn all flesh into grass and all grass into flesh. Lastly, but not leastly, Dr. Greenhow enters on the field. His book bears the blue stamp of authority; and we have it on the statement of its very title-page, that the Queen herself commanded its presentation to the Parliament—a rather important hint, one would think, to the royal purveyors.

From information up to the present date, it does not appear that the Home Secretary has carried out any of the important steps proclaimed by Mr. Gamgee. The cattle markets remain unreformed, and still the lieges who cannot buy good meat buy bad. There is, in fact, no accounting for taste. In this position of affairs, let us review calmly the facts which have been collected, without reference to the out-door clamour or the woes.

The Vienna correspondent of the *Times* enumerates three

complaints, under the head of cattle plagues. 1. A catarrhal affection. 2. A pulmonary complaint, with typhoid symptoms. 3. A highly contagious typhus, which is the real cattle plague or murrain of the steppe. Dr. Greenhow enumerates more forms of general cattle disorder, viz., the *pulmonary murrain*, or lung disease, which was preceded by the *eruptive murrain*, and which has resemblances with both hooping-cough and influenza in the human subject, but differs from both in its inflammatory character; *steppe murrain*, or *rinderpest*, described as a febrile disease analogous to continued fever in the human subject; *dysenteric murrain*, which approaches to the Asiatic cholera in the human subject; and *carbuncular murrain*, considered by German writers as a typhus disease originating in horned cattle, but communicable to other animals, and even to man. In the conclusion of his report, Dr. Greenhow gives the following *résumé*:—

"I. *Pulmonary Murrain.*—1. The cattle disease I was desired to investigate is not of recent origin, but has prevailed among the horned cattle of the United Kingdom for the last fifteen or sixteen years.

"2. It is not peculiar to London, but is generally prevalent in country districts, and among cattle in pastures as well as in those that are exclusively stall-fed.

"3. It is probably infectious, but is also developed spontaneously in consequence of some unknown peculiarities of breed, management, season, or locality, and is not supposed to have been imported into the United Kingdom.

"4. It is identical with the *Lungenseuche* or pulmonary murrain now or lately prevailing in Mecklenburg, Holstein, and other continental countries,

"5. It has no affinity with the disease called in Germany *Rinderpest* or steppe-murrain, with which it has been often confounded by writers in this country.

II. *Murrain on the Continent.*—1. Steppe-murrain is probably more highly contagious than pulmonary murrain, and is said only to originate spontaneously among cattle of the Podolian breed, and in the steppe countries of southern Russia.

"2. Steppe-murrain is probably at present not more than usually prevalent in the south-eastern countries of Europe, and has on former occasions often prevailed more extensively than now in Austria and Prussia.

"3. The only probable chance of the importation of steppe-murrain into the United Kingdom is by way of Prussia. It has recently shown itself at a few places only on the eastern frontier of that country, and has in each case been speedily exterminated by the active measures adopted by the authorities to secure its extinction.

"4. The regulations enforced by the authorities to exclude

steppe-murrain from the Prussian territory, and to extinguish it when it is imported thither, are of so stringent a character as to render its introduction into the United Kingdom by way of Prussia unlikely.

"5. Any measures which it may be considered necessary to adopt for the exclusion of this disease from the United Kingdom must necessarily be of a permanent and not of a merely temporary character, as steppe-murrain is always more or less prevalent in countries adjoining to the eastern frontiers of Austria and Prussia. Perhaps the case would be satisfactorily met if the importation of cattle were prohibited, except from countries which, as regards steppe-murrain, have clean bills of health, and require similarly clean bills from other countries importing to them.

"III. *Sale of Diseased Meat.*—1. Meat derived from animals suffering with pulmonary murrain, and probably with other diseases, is commonly and extensively sold both in London and elsewhere for human food.

"IV. *Effects on Human Health of using the Flesh of Diseased Animals.*—1. There is no satisfactory proof that the consumption of meat derived from diseased cattle, has in this country been productive of direct injurious consequences upon those who have eaten it.

"2. There are reasons for supposing that the use of meat from animals suffering from diseases unknown among the cattle of the United Kingdom has abroad frequently been attended with serious consequences on human health.

"3. The consumption of meat undergoing decomposition has frequently been injurious, and such meat cannot be eaten with safety even when cooked."

To English readers of the omnivorous class, these final deductions of Dr. Greenhow will be satisfactory. He differs in some particulars from Mr. Gamgee in relation to the number of diseased animals sold for immediate consumption in the London market, by indicating that while the number of diseased animals in the market are comparatively few, those to be met with there are not always intended at once for the shambles, but for transportation to rural districts, where they are fed and are brought into an improved condition before being sold for human consumption. We cannot but accept Dr. Greenhow's report as a valuable document, and as an improvement on works of the blue book order.

Mr. Gamgee's two letters are rather of a suggestive political, than of a scientific kind. His suggestions for the suppression of traffic in diseased animal food are as follow:—

"1. Inspectors should be on duty in the great live and dead meat markets whenever business is being carried on,—particularly at night, which, honest people should remember, is busy day with rogues;—and a multitude of rogues live in quasi-opulence by

practising frauds on the food of the people; on no part of it so much as on meat.

"2. Inspectors of nuisances in the metropolitan districts should be provided in number and character proportionate to the duties to be performed. Thus, for instance, it being preposterous to suppose that the 195,000 inhabitants of St. Pancras parish can be protected from filthy and abominable frauds by the one inspector now attached to the district, sufficient provision should be made.

"3. No cattle should be allowed to land on our shores without a clean Bill of Health, which Bill the British consuls at the places of export should be instructed to furnish only upon reliable information, such as could be gleaned from the excellent veterinary schools which abound on the continent. In such matters partial security only engenders false confidence; the guarantee must be the most complete that can be given under the circumstances."

We have already commended the unflinching courage with which Mr. Gamgee carries out his views.

The articles in the *Medical Times and Gazette* are intended to show the relations which diseased food holds to disease. In a preliminary paper, a variety of basic questions are candidly put forward. Here are two examples:—

"Allowing for a moment that the flesh of diseased animals received into the human body has the effect of operating as a poison, what are the modifications of symptoms which it induces, as compared with the original symptoms in the diseased animal? What positive relations do the epidemics in the lower animals bear to the epidemics in man? What modifications in type are produced in the passage of the epidemic disorder from an animal of one class to an animal of another class? Some flickering light on this point, in reference to small-pox and the cow, and cow-pox and man, is all that relieves the darkness of science here at the present time.

"Another point. We will not dream of going back to the efficient causes of epidemics; but we would propound this first and broad inquiry. Is the propagation of epidemic disorders limited to the animal kingdom? Are all the germs of epidemics formed and circulated only in the animal domain? Or does the epidemic phenomenon take a wider root; can it be traced back to the vegetable world? Again, can an epidemic arise spontaneously, as from causes external, *i. e.* independently altogether of the idea of simple propagation of animal or vegetable transmission? Can variations of heat, of electricity, of humidity, excite any special disease which, once communicated to man or animal, shall be communicable to other men and animals?

"In the absence of labours bearing on these all-important and primary inquiries, the so called science of epidemiology is no science at all, but a perplexing, chaotic record of confusion."

In the subsequent papers the writers of the *Medical Times and Gazette* enter more into detail on the questions before

them. They produce in full Renault's experimental conclusions, which in the main go to prove that—

"Conceivable as is the repugnance felt by men at feeding upon flesh, milk, etc., which are the products of animals affected with contagious disease, there is really no danger incurred by his eating the flesh when cooked, or the milk when boiled."

They argue from other testimony and from circumstantial evidence,—

"That the flesh and viscera and milk of animals which die of *miasmatic* or *parasitic* diseases, or are killed during their progress, are unwholesome, and unfit for human food; and that when persisted in they tend to produce dysentery, diarrhœa, or scurvy amongst the people, or diseases which belong to the *dietic* class of zymotic diseases, and which require a persistent use of the pernicious food and some time for their development."

The article on milk contains the following facts, as to what are to be considered the standard properties of good milk newly drawn:—

"The fluid should be of alkaline reaction: this applies to the milk of all animals. The specific gravity should be about 1030: this applies to the milk of the woman and to that of the cow. The taste should be slightly sweet, and free from saline qualities. The colour should be of a yellowish white, opaque, free from blueness on the one hand, and marked yellowness on the other. Microscopically it should present the well known fat-globules, which average about $\frac{1}{4000}$ of an inch in diameter, and are soluble in ether, but insoluble in caustic potash. These globules should float freely over each other, and present no tendency to adhere. All granular bodies having a viscid appearance and a tendency to agglutinate should be absent, as well as globules having unequal borders and dotted surfaces, or the ordinary red corpuscles of blood. The odour of milk should be slightly aromatic, free from pungency, and from any kind of fetor or acidity."

Disordered conditions of milk may arise, continues the writer, from two sets of causes—viz., from modifications in the natural constituents of milk, or from the presence of foreign substances. Milk may thus be acid in reaction—or super-alkaline; it may contain too much water and too little casein, butter, or sugar; it may receive a special flavour from the food on which the cow is fed; it may contain an animalcule, the vibrio cyanogenus, which gives a blue colour, or the vibrio xanthogenus, which gives to it a yellow colour; it may contain blood, or pus, or those peculiar fat globules, called colostrum corpuscles, which naturally occur in milk for a few days after calving—"beastings," as it is called in common parlance.

Reviewing fairly the labours of our cotemporary, we have to thank him for many new and important truths on the nature

of the diseased conditions to which food is subjected. Here the *Medical Times and Gazette* has laid a groundwork which was necessary. Further than this its writers have not yet progressed; and such few and desultory facts as have been collected on the question of diseased food in the production of disease, are not as-yet sufficient to controvert M. Renault's general conclusion. The writer on milk proves, however, clearly that some soluble poisons, taken by the milk-giving animals, may be transmitted by the milk, and may set up poisonous symptoms in other animals partaking of such milk as food.

In relation to the effects of milk as conveying some forms of epidemic disorder, we have ourselves lately observed an isolated natural fact, which deserves a record notwithstanding its unity. At the Metropolitan Free Dispensary, there came before us, during the last month, a woman, who was barely convalescent from a very severe attack of erysipelas of the head and face. She had a child at her breast, which seemed well nourished and healthy. On inquiry, we found that six days after she had given birth to the child, the first symptoms of erysipelas set in. The disease manifested itself with extreme violence. Prior to the occurrence of this disorder, the milk secretion had been free; but with the first symptoms it decreased. The child, however, had no other nourishment. As recovery commenced, the milk returned as before, and the infant continued to subsist only on its natural food. It showed no indications whatever of disease during the course of these events, and at present remains well, the mother herself having made a perfect recovery. The milk of this woman, during the early stages of convalescence, was thin, pale blue in colour, and gave no cream after standing; microscopically it yielded no peculiar appearance.

In the *Annales d'Hygiène Publique*, vol. xxxv, there is an instance recorded, in which a child partook of the milk of a cow which had been bitten by a mad dog, and itself became rabid. The child suffered no injury.

It is not, however, to be presumed that escapes such as these are to be accepted as indicating that an infant can exist in health, on milk of an indifferent character. It is true that as yet we have no evidence to show that epidemic diseases can be conveyed through the breast-milk. But that many life disorders have their origin in this source, there is much circumstantial evidence in proof.

We have not the opportunity at this moment of entering at length into a wider range of new facts or theories on the question of diseased food and disease. But, as we have been appealed

to many times in reference to various doubts and rumours, we can state the following conclusions:—

1. That at this time there is no specific typhus murrain in this country, analogous or identical with the murrain which has recently created such anxiety on the continent.

2. That the lung disorder, known now for some time in this kingdom, still exists, but not in a more intense form than at any other period.

3. That while there is no new specific disease in this country, there are in the unventilated, badly drained cattle sheds, with which the country abounds, all the favourable conditions for the continuance of diseases already present, and for the rapid dissemination of any new contagions or disorders which may spring up.

4. That if farmers would have less faith in cattle drinks, and more faith in pure air and water, and good food, they would save money, and the public would save health.

5. That as regards diseased animal food, and its application as food, there is no evidence to show that such food, when *well cooked*, is capable of conveying to the human subject any specific disorder; but this point is open to further investigation.

6. That the evidence is demonstrative that the consumption of some kinds of diseased food, in an imperfectly cooked state, leads to the generation of some specific forms of disease; such result being most marked in the development of tapeworms in the human subject, from the consumption of measly pork, and of some other varieties of flesh impregnated with entozoa.

7. That soluble poisons, taken by a milk-giving animal, may pass out of her system in part by the milk she secretes, and being taken by others in the milk thus secreted, may give rise to symptoms of poison. That milk, deficient in some of its constituent parts, or having some of these in excess, may interfere with nutrition, and create disorder of the alimentary functions, but that there are as yet but few proofs that the milk of a diseased cow used as food, possesses the power of producing any specific disease.

8. That owing to the chemical force of digestion, many organic agents, which would prove rapidly poisonous if sent direct into the blood, may be received through the stomach with impunity. But that the digestive process does not interfere with or prevent the development of the tapeworm, or of other forms of entozoa.

9. That the best protection for the masses against all possible mischiefs arising from bad meat, consists in their selecting their own provisions, in choosing the best, and in eating no animal food that is not well and cleanly cooked.

THE EPITOME OF SANITARY LITERATURE.

SEWERAGE AND AGRICULTURE.*

MR. CAMPBELL gives in this essay a history of the various plans for the utilisation of sewerage, which we embody, as of value to such of our readers whose minds may now be directed to the subject.

"In 1802, a person of the name of Estienne proposed to gather the excrements into tanks, to allow the liquid parts to run off, and to dry the residue in the sun, either alone or mixed with lime.

"When this dry mass was stowed into sheds in heaps, its temperature rose to 212 deg. Fah.; afterwards it was crushed into a powder, which is stated to have been devoid of all smell, and not very bulky. A few years afterwards Sir Humphrey Davy, in a lecture delivered to the Board of Agriculture, mentioned especially mixing quicklime with night soil, to deprive it of its disagreeable smell, and observed at the same time that the Chinese, whom he considered to possess more practical knowledge of the use and application of manures than any other nation, are in the habit of mixing their night soil with one third of its weight of fat marl, make it into cakes, and dry it by exposure to the sun. 'These cakes,' Sir Humphrey adds, 'we are informed by the French missionaries, have no disagreeable smell, and form a common article of commerce of the empire.'

"After these suggestions on disinfecting night soil, and depriving it of odour, no further progress appears to have been made until as late as 1836, when M. Poitevin noticed the value of carbon, as an adjunct to marl, for disinfecting substances, and obtained a patent for the preparation of a powder containing charcoal for this purpose.

"The first after M. Poitevin appears to have been the Count de Hompesch, in 1841; he proposes to grind up the carbonaceous residue from the retorts after distilling the oils, from clay, slate, asphalte, or minerals containing bitumen, and to mix this powder with animal or putrid matters, to form a most powerful manure without any smell. The Count observes that, when iron pyrites is present in the mineral, which would be the case were schist employed, it is to be dissolved out of the powder with an acid previous to use.

"In 1842 Dominic Frick Albert proposed to collect the refuse from nearly every trade and manufacture, to mix it with animal excretion and charcoal for the purpose of making manure.

"In June, 1845, M. Du Buisson distilled oils from bituminous matters, and employed the carbonaceous residues from the retort mixed with the ammoniacal liquor from the distillate to absorb

* The Application of Sewage to Agriculture. By DUGALD CAMPBELL, F.S.A. London: 1857. [Paper read before the Chemical Society.]

fresh or coagulated blood, or any other soft animal material, such as night soil or brains, or liquid, such as urine, by which the power of the manure is increased.

"In August 1845, John Evans proposed to manufacture manure by collecting and mixing together every kind of animal refuse with urine and the refuse of a great many trades. These substances were to be treated under different circumstances with different chemical agents, such as decoctions of oak, pyroligneous acid, sulphate of iron, alum, pyrolignite of iron, naphtha mixed with a small quantity of nitric acid, sulphuric acid, and magnesia.

"Early in 1847 Mr. Edward Brown proposed to neutralise the odious and noxious gases emanating from fecal substances so as to preserve them for manure without injury to the public health by means of sulphate of iron, chlorides of sodium, iron, or manganese, nitrates, sulphates, and chlorides of lead, copper, zinc, and tin, pyroligneous acid, coal tar, or schistous and bituminous extracts; the fecal substances were to be mixed with an absorbent powder made by incinerating, in close vessels, coal or wood ashes and earth, street or road sweepings, sawdust, bonedust, and the waste water of tan yards, cotton mills, &c.

"In May 1847, Mr. William Bridges Adams and Mr. Robert Richardson proposed to construct, at railway stations, close cisterns of slate or metal, or other eligible material, into which the urine might drain, or to use chemicals for absorbing the volatile alkali and other gases.

"Edward Parker, in October 1847, proposed to submit a mixture of vegetable and mineral materials to the action of fire, and amongst the things suggested are night soil and urine.

"Mr. James Young, now of Glasgow, in a paper read before the Manchester Literary and Philosophical Society in December 1847, suggested for deodorising cesspools the refuse of the chlorine process, which is principally chloride of manganese, and which he stated was at that time a useless product, one factory throwing away daily thirty-six tons of this solution of about sp. gr. 1,280 or 1,300.

"Mr. Jasper Wheeler Rogers, in 1848, proposed to prepare charcoal from peat and combine it with animal excrement, for the purpose of making an inodorous manure.

"In 1849, M. Louis Napoleon Legras proposed to construct water-closets in such a manner as to separate and keep apart the solid fæces from the liquid. These were afterwards to be deodorised and mixed with charcoal ground to a powder, or soot.

"Mr. Henry J. Tarling, in 1850, manufactured manure with night soil and highly carbonised refuse tan as the disinfecting material.

"In June in the same year, Paul D'Angely deodorised every species of excreta by using a fluid composed of fresh bark, rue, or wild mint and sulphate of iron; the fæcal material was afterwards to be dried in a chamber and mixed with powdered peat charcoal.

"In 1850, James Hamilton Brown disinfected fæcal and putrid matters by the addition of basic salts, such as subsulphate of the protoxide of iron. A solid disinfecting agent, or one in a state of paste, was to be made by mixing 'some metallic salts with some cheap oleaginous material.' Chloride of calcium neutralised by gas liquor was to be employed likewise, or a lactiform liquid, made by mixing oil with water and some alkali. No carbonaceous matter appears to have been added; but, in case filtration were necessary, preference is given to a filter formed of carbonaceous substances. It is also stated that more rapid and perfect clarification or decantation may be effected by the addition of any compound of alumina, but particularly the double sulphate of alumina and potash, or the impure sulphate of alumina.

"In 1852, Mr. William Armand Gilbee employed a decomposing powder, composed of molasses or the residues thereof, slacked lime, sulphate of iron or zinc, and clayish magnesian earth, which was to serve the purpose of converting fecal matters into a manure fit for agricultural purposes.

"In 1854, Mr. Thornton John Herapath employed the coke of Boghead coal or Torbane mineral, either before or after the aluminous ingredients are extracted, for drying, deodorising, and absorbing urine, fæces, etc.

"In October of the same year, Mr. William White carbonised night soil or other animal refuse and fish in a close retort, and while in a state of incandescence introduced a quantity of potash or soda, then, after closing the mouth of the retort, the whole was exposed to a bright red heat for about an hour; a portion of the carbonaceous matter is said to combine with the nitrogen of the atmosphere which finds its way into the retort, forming cyanogen; this unites with the base of the alkali employed. The distillate is condensed in a solution of common salt or dilute acid, added to the cyanic compound in the retort, and the whole afterwards mixed with such substances as dried night soil, superphosphate of lime, common salt, wood ashes, dried blood, and soot. Disease, attacks of insects, or fungi on plants, are said to be prevented by a mixture of hydrate of lime, sulphate of alumina, sulphate of protoxide of iron, sulphate of magnesia, charcoal, prepared as above, biphosphate of lime, and chloride of sodium, together with the condensed volatile matters, and this is termed the 'plant preservative.'

"Mr. Alexander Macdougall, in February 1856, proposed to subject night soil and a number of other animal matters to the joint action of heat and sulphurous acid; and, in July of the same year, Mr. James Alexander Manning manufactured manures or fertilising agents from the waste of towns and other localities by subjecting fæcal matters from privies and cesspools, and all animal excrements, stale urine, also the diluted or undiluted urine from public urinals, railway stations, and factories, together with other kinds of refuse, to the action of sulphuric acid or distillation.

"Mr. Bridges Adams has, in a recent number of *The Engineer*,

discussed the possibility of dealing with the excrement of the population of London without allowing it to pass into the sewers, He considers that if, by a mechanical arrangement of water-closets, the fæces and urine are collected apart, the latter may be barrelled up and very profitably transported by rail to agricultural districts."

The value of manurial substances, contained in human excreta, is estimated by our author thus:—

"For a population of 10,000, the quantity of dry solid in the excrement yearly will amount to 205 tons, which would have a money value of £3,075 sterling. This estimate is made upon the assumption that the ammonia in excremental material is worth £70 per ton; the phosphoric acid £56 per ton; and the potash £70 per ton.

"The chief element of the manurial value of town sewage is the excremental material, and this, in the instance of London, with a population of 2,600,000, amounts annually to 53,393 tons of dry solid, which, as I have already shown, contains ingredients which give it a value of £15 per ton at least.

The quantity of ammonia which this contains or is capable of producing is	11,440 tons.
The phosphoric acid	1,839 „
And the potash, etc.	1,331 „

These three items make up a money value of about £836,834.

"The number of methods that have been proposed for obtaining manure from town sewage are not by any means so numerous as those for working excremental substances. For the present purpose they may be considered under three heads:—

"1st. Filtration through various media, before, and after the addition of chemical substances.

"2nd. Precipitation by means of various reagents.

"3rd. Irrigation."

Reviewing the three modes here named, Mr. Campbell inclines to that by irrigation; and concludes, that by no process of chemistry hitherto known, can a highly valuable solid manure be obtained from town sewerage alone.

METROPOLITAN AND TOWN SEWERAGE.*

Few men have paid so much earnest attention to the sewerage question as Dr. Sayer. In his present work he supplies some most valuable and curious information. The following passages give the pith of Dr. Sayer's practical views:—

"No human foresight can possibly assign limits to the growing extent and population of London,—therefore any *scheme*, that provides only for a limited prospective period of time, is unworthy of the present era, and not commensurate with the future.—No

* Metropolitan and Town Sewage; their Value and Disposal. By A. Sayer, M.D. London: Calder. 1857.

scheme that does not contemplate all present and possible future localities of London, that cannot minister to all levels and falls east and west of the whole water-shed areas, north and south of the Thames, is not commensurate with the requirements, present or prospective, of her population.

"Is not the time at hand, when adequate steam power should transfer to numerous covered reservoirs and covered filtering beds, within our agricultural districts, near and remote, through closed cast-iron channels, receiving in their course daily abundant tributary streams from the metropolis and all large towns, *'sewage waters,'* to spread by irrigation, fertility and minister to increasing abundance?

"Our public roads,—the net-work of modern railways, will indicate the appropriate lines,—and the electric telegraph will minister its ubiquity, to govern and regulate valves for transmissive circulation. Should not the metropolis initiate a great system, in union and co-operation with our sister towns, to *'restore'* to the land that which modern domestic adaptations have taken from our soil, in *violation* of the *beneficent* law imposed on all human and animal existence, which ordained,—that by the multiplication of living creatures, *'the earth is to be replenished'* with the elements of ever renewed and increasing fertility?

"Poor and rich, the peasant and the peer, all are equally interested in the great undertaking, pregnant as it is with more abundant crops, more numerous herds, plenty and price, content and happiness."

ANIMAL PHYSICS.*

Dr. Lardner's new volume on Animal Physics is a work long waited for and wanted. In a book of 705 pages, profusely and admirably illustrated with drawings, the public are presented with a masterly summary of the laws which govern life. Dr. Lardner's style of writing combines the pure scientific, with the equally pure common-sense trait of appealing to all intellects. The Animal Physics is a work which the professional and scientific man will read and study with immense pleasure; he will think it a learned and classical book. The mechanic too, visiting his reading room, will read it, and think it easy and popular. The book does not admit of condensation or analysis, since it is a pure recital of scientific facts. All we can say of it is, that it is the best general review in the English language of the physics of the animal world, and so leave it favourably recommended to readers.

TORQUAY, A RESORT FOR CONSUMPTIVES.†

In this work one of our most accomplished provincial phy-

* Animal Physics; or the Body and Its Functions Familiarly Explained. By DIONYSIUS LARDNER, D.C.L. London: Walton and Maberly. 1857.

† Torquay in its Medical Aspect as a Resort for Pulmonary Invalids. By C. RADCLYFFE HALL, M.D. London: Churchill. Torquay: Cockrem. 1857.

sicians supports the view of the rational cure of consumption by attention mainly to the laws of life. "In the machinery of animal life," says this author, with great force, "the main condition of strength is *exercise within the limits of power.*" Torquay, according to Dr. Hall, presents special advantages, in that it allows the consumptive invalid to take outdoor exercise very constantly throughout the winter. And the winter here is short; it arrives so late, and spring so early, as constantly to excite remark amongst the natives from the north who visit this part of the south. Dr. Hall recommends that a consumptive invalid should not remain the whole year at Torquay. It is a double advantage for him to leave for June, July and August. In the seventh chapter, the author supplies, from Mr. Vivian, the following meteorological facts:—

"The mean *annual* temperature of Torquay was (omitting decimals) two degrees (F.) higher than that of all England. The maximum temperature for the whole year was seven degrees lower. The minimum temperature was twelve degrees higher. The mean daily range of temperature was five degrees less. The mean quarterly range of temperature was thirty-one degrees less. The average number of days on which the rain fell was fifteen days less. The depth of rain was two inches greater. The average quantity of vapour contained in the air for the whole year was the same. The additional quantity of watery vapour required to saturate a cubic foot of air was greater at Torquay by ·2 (Torquay, ·9; allEngland, ·7). The average humidity of Torquay was ·6 less (Torquay ·76; all England, ·82)."

Dr. Hall's book well deserves the careful study of all who wish to find an Atlantis for consumptive patients or friends.

MANAGEMENT OF THE SICK ROOM.*

This little work, by Dr. Bakewell, contains useful hints. They may be epitomised as follows:—1. If you think yourself so ill as to require advice, get it at once from a qualified man. If you require no doctor, you are better without physic. 2. Ventilate the sick room thoroughly. 3. If there is in the sick room an offensive odour, do not make it worse by disguising it, by burning pastiles or other trash—but let in the air, and let out the cause of the smell. 4. Water-beds are the most useful for the prevention of bed-sores. 5. Keep the sick man quiet—a fussy nurse is worse than a lazy one. 6. Chloride of lime is the best disinfectant.

* Practical Hints on the Management of the Sick Room. By R. Hall Bakewell, M.D. London: Snow. 1857.

STATISTICS OF INSANITY.*

These statistics of insanity contain much interesting matter relative to the causes of insanity, and to recoveries and deaths. Dr. Hood bears strong testimony in favour of active exercise as an incentive to mental restoration, this being the only hygienic subject introduced.

"At a certain period of convalescence," he observes, "long walks beyond the precincts of the Asylum, under proper surveillance, are of the highest utility, as has been abundantly proved in the experience of Bethlem and elsewhere. Amusements, such as cricket, bowls, or skittles, are also of great use; and so are all the amusements which can be commanded within-doors. But occupation is even of greater importance than amusement; indeed systematic employment, in various forms, is now a duly recognized essential to successful treatment in all properly conducted Asylums. Pinel recommended that an asylum should have a farm connected with it, in which patients could labour; and great credit is due to the late Sir William Ellis for having called attention to this principle, in this country, by giving appropriate work to the patients successively under his care in Wakefield and Hanwell. Esquirol mentions a fact from Bourgoise's Travels in Spain which speaks volumes on this subject: it is, 'that the rich in the Hospital for the Insane at Saragossa are not restored in the same ratio as the poor, *because* they are not obliged to labour.'"

LEGALISED CAUSES OF CRIME.†

Mr. Roberton's essay is closely argued. His remarks on legalised forms of temptation are limited to three:—1. The laws relative to bastardy and seduction, amongst women of the lower classes. 2. The laws authorising the Sunday traffic in the sale of intoxicating drinks. 3. Some things in the present state of the Poor Law tending to engender crime. Regarding the first of these clauses he says, "Not that the law should be made less stringent towards the woman, but that some punishment should be meted out to the man by whom seductions are brought about, the man being the aggressive animal in illicit intercourse." Regarding the second clause, he argues the propriety of the entire suppression of Sunday traffic in intoxicating liquors; and in respect to the third clause, he suggests that every guardian of the poor should at certain intervals—say twice in the year—visit the out-door poor in the district for which he has been elected, so as to obtain a correct esti-

* Statistics of Insanity; being a Decennial Report of Bethlem Hospital, from 1846 to 1855, inclusive. By W. CHARLES HOOD, M.D. London: Batten. 1857.

† On Certain Legalised Forms of Temptation as Causes of Crime. By JOHN ROBERTON. Manchester: 1857.

mate of their physical and moral condition. What are the Manchester men about, that John Roberton does not represent them in St. Stephen's? Such a man should surely have a voice beyond the sphere of one English city.

CLIMATE AND RHEUMATISM.*

Dr. Fuller's very complete and able work on Rheumatism has reached its second edition. Remarking on climate, and its effects on the production of the disease, Dr. Fuller opines that climate *per se* has only a predisposing influence. Looking on the disease as arising from an agent that requires to be eliminated from the body chiefly by the skin, he argues that in summer, when the skin is acting freely, the disorder should be least frequent, and that in damp and foggy seasons it should, for opposite reasons, be most frequent. The facts are so, and the explanation is simple and explicit. The book is an admirable specimen of a standard work, its only defects being its terrific foot-notes, which spoil the reading of the text, and its recipes.

MISCELLANEOUS WORKS.

A variety of works lie before us, the matter of which has only an indirect bearing on sanitary science. Dr. Dobell has a learned essay on the *Class of Medical Literature most needed in the present day.* It contains some good historical notices. Dr. Webster has an able paper on *Belgian Lunatic Asylums,* which deserves the reading of all who are interested in mental diseases. Dr. Cockle has a good practical essay on the *Second Sound and Murmur of the Heart.* Mr. Acton publishes an essay on the *Reproductive Organs;* the mildest criticism on which is, that other works by the same author may be read with infinitely more profit. Mr. Hare has a book on *Cases of Spinal Deformities,* which is too special to be more than noticed here. Mr. Urling, in a treatise on *Vocal Gymnastics,* recommends imitation of correct sounds as the grand agent in the cure of stammering. Lastly, for time is short, Dr. Fell has brought out, in a *Treatise on Cancer, and its Treatment,* his "original" mode of meeting this fell disease. The spirit of William Shakespeare, without any rapping, left on the reviewer's paper at midnight its criticism on this work:—"Speaks an infinite deal of nothing: his reasons are two grains of wheat hid in two bushels of chaff; you shall seek all day ere you find them; and, when you have them, they are not worth the search." Rather hard on the part of William!

* On Rheumatism, Rheumatic Gout, and Sciatica. By HENRY W. FULLER, M.D. Second Edition. London: Churchill. 1856.

ORIGINAL COMMUNICATIONS.

THE HYGIENE OF THE TURKISH ARMY.

By J. N. RADCLIFFE, M.R.C.S.Eng., late of the Staff of His Highness Omar Pasha.

I. THE SOLDIER.

CLAD in a dress which is not adapted to his habits, and equipped with somewhat cumbrous accoutrements, the aspect of the Turkish soldier is not, at the first glance, very satisfactory. While the dark regulation blue of his uniform retains its pristine tint, and the bright red of his fez is yet undimmed, and while his weapons still glitter with the polish of the manufactory, he has some semblance of that neatness which the occidental looks for in the well trained soldier. But when, after a brief period, the short-cut tunic has shrunk out of all proportion, and has become flecked with brown and greyish-white stains, as of mildew, the original blue having early faded; when the coarse strands of the cloth are visible at many a roughly used point; when the fez has become pale or clouded, and the tassel, almost devoid of colour, hangs dishevelled beneath the dimmed brass;* when the ungainly slippers look still more ungainly from engrained dirt, which is never removed by the brush, or hidden by blacking; when the weapons and accoutrements bear glaring marks of imperfect cleansing; and when, together with much that is untidy, there is an absence of all smartness, then the Turkish soldier seems but a caricature of western military fashions.

This, indeed, was the general aspect of the Turkish soldier during the war of 1854-6; but notwithstanding that his slovenly and unsoldier-like bearing might rout every preconceived notion of military requirements, yet the most superficial observer could not fail to notice the matured physical powers of the man, and the ease with which he moved under a heavy pack. When the eye had become accustomed to the shortcomings of dress and bearing, it soon recognised the admirable stuff of which the Turkish soldier was made, and his fitness for a military life.

Temperate in his habits, the duties of the barrack and of the camp deprive the Turkish soldier of no luxuries that he cares for; accustomed to a diet admirably adapted, from its sim-

* The soldiers of the Turkish army, and the sailors of the navy, have a small circular plate of polished brass fixed upon the summit of the fez. This plate is a distinctive mark of the Imperial military and naval service.

plicity, for the field, and having few wants, he can struggle with the vicissitudes and hardships of a harassing campaign, perhaps better, and with less suffering, than the soldiers of any other nation; and, as he has few vices, the restraint of military discipline does not fret him. He is not, as a rule, cleanly in his person, unless he can have access to a bath, which he will use as often as his means will permit; or unless he is under the command of a smart officer. The soldier may certainly perform with scrupulous regularity the daily ablutions prescribed by his religion; but these ablutions, as ordinarily practised, are not such as to ensure cleanliness. He is indolent, and ignorant of most things beyond the immediate sphere of his military and religious duties. Steady in the former, he is regular in the latter; and, during a campaign, he may be seen, at the appointed hours, within the camp, upon its verge, or at the road-side, performing the accustomed prostrations, and repeating the necessary prayers; and at sunset, whole battalions and regiments, headed by their priests, will draw up in front of their encampments, and, with all the regularity and order of a parade, fulfil their devotions.

The most marked characteristics of the Turkish soldier during the war of 1854-6, were maturity of age and of physical development; and in these respects, so far as could be judged by a general examination, in the absence of all numerical data, he contrasted most favourably with the soldiers of the other sections of the allied forces, and particularly with the British and French soldiers.

The influence of matured physical powers in maintaining the efficiency of an army in the field, particularly during a harassing campaign, is an important question of military hygiene. The experience of our own army in the Crimea, would seem to show most conclusively that immaturity of age, and incomplete physical development of a considerable portion of the men, were among the most potent predisposing causes of disease; and, also, that they were influential in fostering a high degree of mortality. That the matured physical powers of a great proportion of the Turkish soldiers had no inconsiderable effect in maintaining the efficiency of the Turkish forces during the Crimean campaign, notwithstanding the protracted sufferings entailed by a wretched *quasi* Commissariat,* and the bad hygienic condition of crowded and long occupied camps, may be fairly assumed.

Dr. Lyons, in his *Report on the Pathology of the Dis-*

* The Turkish army has no regular commissariat.

eases of the Army in the East, makes the following instructive remarks on extreme youth and incomplete physical development as a predisposing cause of disease amongst the troops:—"In treating of the various predisposing causes of disease in operation amongst Her Majesty's forces in the East, there is one which may be classed amongst physiological influences, and which demands most earnest consideration at your lordship's hands. I allude to the extreme youth, incomplete physical development, and general immaturity of a very considerable proportion of the strength of several regiments; constituting, as I have reason to believe, in the total of the army, a number sufficiently great to render the question one of vital moment and of even national interest, as largely affecting what may be called the physiological economy of the army. Amongst even well matured constitutions, the hardships and fatigues, trials, privations, and exposure of campaigns, such as those of the past years in the Crimea, must almost of necessity prove largely productive of disease, and induce much mortality. But on the undeveloped frames, and the unripe strength of the ill seasoned recruit, such causes operated with two-fold energy, and with a more than doubly fatal effect. Not only does the power of resistance to morbid influences, and the consequent invasion of disease in such youths, seem inferior to that of the older soldier, but when attacked they succumb more readily under the effects of a fever or a flux. And even when such a disease does not prove immediately fatal, the convalescence of the young is generally slow, constantly attended by a disposition to relapse, or to the development of those secondary enteric lesions, the almost unfailing result of such fevers as those which prevailed amongst the troops of the East. * * * The results of surgical pathology corroborate, to a large extent, the observations just made, which are chiefly based on considerations arising out of the behaviours of the immature constitution under the effects of disease. As a general rule, true, at least, in a very large part of its usual acceptance, youth forms a favourable element in the calculation of chances of surgical cases. Amongst the troops in the Crimea, however, no such favourable anticipations could be indulged in on the score of youth. The constitution of the young, even independently of the presence of actual disease, seems much impressed by the influence of the various causes dwelt on; many succumbed almost immediately under the shock of injuries; and in the case of the graver surgical operations, no more advantageous results, but the contrary, appeared to be shown on the side of the young: in fact, youth

was not to be counted on as a favourable element in determining a prognosis in such cases." (p. vii.)

The Turkish army is recruited by voluntary enlistment, and by a species of conscription among young men of twenty years of age, and upwards, or among those who are supposed to have reached that age. Every man pronounced to be in good health and of the proper age, is summoned to form part of the annual contingent, but only one member of each family is enrolled, and only sons are exempt. The conscription falls upon the lower orders, the rich escaping. The officers, as a rule, are obtained from the same class of society as the men, and, in consequence, they are extremely ignorant. It is estimated that the male population of Turkey in 1844 amounted to 19,533,124, of which 4,784,490 were of military age (twenty to forty years); a levy of one man in ten of the military age would give a force of 478,449 men. (*Registrar General's Sixteenth Annual Report*, p. 122.)

II. THE DRESS.

The uniform of the Turkish soldier is made of the coarsest materials, and its colour, dark blue, is fleeting. Moreover, the regulation tunic has a wretched and uncomfortable aspect, and straight-cut trousers are unsuited to habits of kneeling and sitting cross-legged. The soldier is not ill clad, so far as amount of clothing is concerned, and his dress is in several respects well fitted to the climate of the different parts of the Turkish empire. The complete suit of strong cotton which every man wears next the skin, is calculated to protect the surface from those slight, but sudden, alterations of temperature which not unfrequently accompany exposure to the evening breezes, or the light airs of early morning, during the hotter seasons of the year, and which are apt to induce serious functional and other disorders. On the other hand, during the colder seasons, the under-clothing, which is then made of cotton of a closer and heavier texture, contributes in an important manner to the maintenance of the warmth of the body.

In the summer, loose white trousers are worn, and, according to the regulations of the service, a white jacket should be issued to each man; and when, at this season, (as in the case of the Egyptian troops,) the men are clad altogether in white, the effect is most pleasing, particularly on parade. The loose white dress sets off both the men and the accoutrements, and the bright red of the fez, and its polished brass plate, give a brilliant finish.

The fez affords slight protection against rain and the sun,

and it does not give any shade or defence to the eyes; yet, obnoxious as this head-dress may be to western notions, no very apparent evils arise from its use—at least, trustworthy evidence of its harmfulness is wanting. The hood, which is attached to every soldier's over-coat, is an additional protection to the head from wet; the existence of any peculiar tendency to evil effects arising from undue action of the sun's rays upon the head, and consequent upon the use of the fez, is doubtful; and although some medical men consider that the fez induces an unusual amount of ophthalmic affections amongst the Turkish troops, yet these affections are so frequently, if not generally, associated with filthy habits, that the correctness of the conclusion may be doubted.

Early in the spring of 1855, when attached to the Turkish forces at Eupatoria, I noticed that a large number of the soldiers were affected with *ophthalmia tarsi*. The disease was almost invariably connected with great personal filth, and it was most commonly found among those men who were crowded in the filthy hovels within the town, particularly in the deserted shops, which had never been fitted up as dwelling-houses. In these wretched quarters the men sought warmth from close crowding and incandescent charcoal, and they rested upon floors of hardened mud. At the same time the food of the men was insufficient and of bad quality, and the water chiefly used was brackish.

The infantry are shod with loose strong slippers; the cavalry with boots which extend to the middle of the leg; and both classes of soldiers wear thick woollen stockings.

The soldier loves to have his legs warmly clad, and he often has recourse to sundry effective but ungainly expedients, in addition to the means provided for him, to attain this end. The peasant recruit, accustomed to enwrap his legs in some thick material, the folds of which are kept in their place by ligatures of twine, carries this habit into the camp, and the suburban or town-bred recruit adopts the more sightly "legging" of eastern costume. It is not uncommon, during a march, to see the soldier with his trousers and drawers rolled up to the knee, exposing legs so swathed as to be almost shapeless.

The slipper is, perhaps, the most objectionable portion of the soldier's dress. An abomination in wet weather, and a serious impediment in mud, it is only when the ground is hard and dry that this form of covering for the feet is at all supportable. Certainly from habit the Turk shuffles along exceedingly well in the slipper, and it is endeared to him by the usages of his

religion; but thus shod the soldier can rarely, if ever, acquire that smartness of action, and precision of step, which is requisite to the perfection of a western drill. In the best trained regiments, shortcomings from this source may be discerned, and no cause contributes more to that want of a soldier-like bearing, which is so conspicuous among the Turkish troops.

The slipper is an imperfect protection against wet and damp, and its use is doubtless a common source of disease, although habit, and the custom which is usually practised by the Turkish soldier, particularly in inclement weather, of clothing the legs warmly, may diminish the chances of mischief.

Each soldier is provided with a long large over-coat, to which is attached a capacious hood. The over-coat, which is of sufficient length to extend below the middle of the leg, is made of coarse, heavy cloth, and it shields the body tolerably well from both wind and rain.

The Turk has a habit which is very instructive. When in the morning or the evening, during the hotter seasons, he reclines in the open air, or before the unclosed window, he will generally have cast loosely around him, if he be of the wealthier class, a large coat lined with fur, or if he be of the poorer class, a heavy sheep-skin coat. Thus, without incommoding himself, he is safely protected from the evils which the cooler hours of the day might bring to him, and he resists more effectually the insidious poison which is often borne upon the wind. For in most parts of the Turkish empire the wind, sweeping over imperfectly cultivated or marshy tracts of land, is apt to be laden with pernicious malaria, which finds a lodgment most readily during the hours when the system is relaxed.

Another habit customary with the Turk when enjoying himself in the open air, and worthy of note, is the use of the carpet spread upon the ground. The carpet not only makes a cleanly seat, but it also protects from whatever moisture there may be at the surface of the earth.

The Turkish soldier practises both these habits, and he may be seen, in the intervals of duty, squatted upon his carpet, and with his large, hooded great-coat thrown loosely over his shoulders, enjoying the cooling breeze, and inhaling the grateful fume of tobacco.

The issue of clothing to each soldier is as follows:—One uniform coat, one pair of uniform trousers, two pairs of white trousers, a light jacket for summer, two winter shirts, two summer shirts, two pairs of winter drawers, two pairs of summer drawers, two pairs of stockings, and one fez, every year;

one pair of slippers every three months; and a great-coat every three years. A carpet, measuring about six and a half feet in length and four feet in breadth, is also issued to each man yearly.

The weight of the knapsack and accoutrements of the infantry soldier, in marching order, and exclusive of the weapons, is full twenty *okes* (fifty-five pounds).

III. THE FOOD.

If there be one subject in connection with military hygiene which is more important than another, it is that of food; for the efficiency of an army is, perhaps, more dependent upon the character of its food than upon any other thing.

The food of the Turkish soldier is in many respects singularly well adapted to a military life. At first the coarse brown bread, the dark hard biscuit, the lean ill fed meat, the lard-like fat, and the filthy rice, which form the bulk of the rations, have a repulsive aspect to the occidental, and they seem ill calculated for the proper nutrition of the soldier; but the food is such as he has been habituated to from childhood; the bread, when made with ordinary care, is sweet and wholesome; a substitute for the scanty fat of the meat is furnished by the *yagh*—the sheep's tail fat—of the rations; and dirt is a remediable and the only evil of the rice.

The daily ration scale of the Turkish soldier is as follows:—*Bread*, three hundred drachms (*i. e.*, about thirty-four ounces: eight drachms and three-quarters being equal to one ounce avoirdupois); *meat*, ninety-two drachms (ten ounces and a half), except on two days of the week, when no meat is issued; *rice*, twenty-five drachms (two ounces and three-quarters), which are used in the preparation of soup; but on the days when the soldier receives no meat, ninety-two drachms (ten ounces and a half) of rice are issued for the preparation of *pillaff*; *yagh**—sheep's tail fat—sixteen drachms (one ounce and three-quarters); *olive oil*, twenty-five drachms (two ounces and three-quarters), used for light and for cleaning arms, as well as for food; *salt*, about four drachms (half an ounce); *vegetables*, (onions, *nohud* (chick-pea ?), haricot-beans, etc.) a variable quantity.

The issue of rations to the Turkish soldiers is upon the same scale, and includes all the before-mentioned articles of food, in peace and in war: and in this respect the regulations of the Turkish army differ materially from those of our own

* "*Yagh*" is a general term for butter, grease, tallow, oil, fat, etc.; but the "*yagh*" of the soldier's rations is generally prepared sheep's tail fat.

army. In the British army, under ordinary circumstances, and in non-tropical climates, bread, or biscuit, and meat, are alone furnished to the men, the remaining articles of food being purchased by the soldiers themselves, subject simply to the control arising from the organisation of the messes.

The regulation governing the issue of rations in the Turkish army, although originating, in all probability, from another and far different source, is worthy of consideration in reference to hygiene.

It is a questionable policy which does not at all times provide for the soldier the full amount of those articles of diet which are requisite for the preservation of health; for in a matter of such importance it ought not to be left to the soldier, as in our own army, to eke out somewhat scanty rations from a scantier pay, as, notwithstanding that messing may obviate any serious mischief from this source, and that the men may prefer to purchase food for themselves (probably because they can thus obtain a more varied diet), yet a liberal ration scale, such as is adopted in our navy, would give the soldier a better regulated and sufficiently varied diet, and probably be more conducive to health.

Again, without the adoption of such a ration scale it would, perhaps, be impracticable to teach the soldier efficiently that knowledge of the best methods of preparing food, the want of which, in our own army, is not only a glaring evil, but it is also one of the gravest sources of disease during a campaign.

Moreover, unless a complete and constant ration scale be adopted, it is improbable that a class of officers can be trained who will be capable of contending properly with the difficulties of providing an army in the field with food. A knowledge of the character and value of food, and of the readiest substitutes for important articles of diet, cannot be obtained without a specific training, and it is from the want of this training that our Commissariat has been generally so lamentably inefficient at the commencement of a campaign. The sad illustrations in confirmation of this statement, which may be derived from the history of the Crimean war, will be still fresh in the memory.

The rations of the Turkish soldier are very liberal. He wants for none of the essentials of diet, and the proportion of meat, although small, is quite consistent with his habits and taste, meat being held in much less regard by the oriental than by the occidental. The rations, irrespective of vegetables, contain somewhat more than forty-nine ounces of solid aliment. This amount of food is more than the soldier requires

under ordinary circumstances, and it is amply sufficient to satisfy his wants during a campaign.

Probably the soldier of no other nation in Europe is so plentifully rationed as the Turkish soldier, and the contrast with the rations of our own soldiers is great. The daily rations of the British soldier, in non-tropical climates, are one pound of bread, or three-quarters of a pound of biscuit, and one pound of fresh or salt beef, or pork. In tropical climates the rations are the same, "except that on two days of the week the issue of salt pork is reduced to twelve ounces, and the soldier receives in lieu of the remainder a daily issue of five-sevenths of an ounce of cocoa, one ounce and two-sevenths of sugar, and a quarter of a pound of rice, or half a pound of peas." (*Statistical Reports on the Sickness, Mortality, and Invaliding among the Troops in the United Kingdom, etc.*, 1853, p. 118.) Under extraordinary circumstances the amount of the rations is increased; and during the Crimean war the soldier received daily one pound and a half of bread, or one pound of biscuit, one pound of fresh or salt meat, two ounces of rice, and rations of sugar, and coffee, or tea. The usual daily ration of spirit, half a gill, was also increased to one gill. Thus the weight of the British soldier's rations, exclusive of vegetables, varies, under ordinary circumstances, from thirty-two to thirty-six ounces, and under extraordinary circumstances from thirty-four to forty-two ounces; in the first instance the amount of solid food being from thirteen to seventeen ounces less than in the rations of the Turkish soldiers; in the second instance from seven to fifteen ounces less. The common use of sugar, coffee, or tea, and spirits by the British soldier is not, however, to be lost sight of; and a regulation exists in our army by which the different messes may claim an extra amount of bread or biscuit if it be required. Moreover, the food of the British soldier is of a much better quality than that of the Turkish soldier.

The daily rations of the British sailor may be regarded as a standard of the amount of food requisite to maintain the body in full health. These rations contain from forty to forty-eight ounces of solid nutriment, inclusive of eight ounces of vegetables.

The Turkish soldier eats two meals daily, the first meal being taken two hours after sunrise, the second one hour before sunset, and in the interval the soldier rarely takes any food. The evening meal is the most substantial meal of the day. The rations of the Turkish soldier are amply sufficient for two excellent meals daily, and, if requisite, for a third and slighter meal.

It is difficult to dogmatise upon the times and the method in which food should be taken, as so much depends upon peculiarities of duty and of habit; but it is questionable whether a more fitting plan could be adopted than that which is used by the Turkish soldier, whether the subject be considered physiologically or in reference to the duties of a military life. The division of the rations into two full and substantial meals, and the consumption of these meals at the commencement and termination of the day, fulfil the most important physiological requirements for the sustentation of the body; for by such an arrangement the food is very equally divided over the whole day, and the interval which elapses between the meals admits of digestion and assimilation being fully and properly effected. Moreover, a solid and substantial meal at the commencement of the day is the best preparation for military duty, particularly in the field; and a still more substantial meal at the termination of the day is the method best adapted for recruiting the exhausted physical powers, and for preparing the soldier to undergo the fatigue of night duty.

The importance of the latter consideration during a campaign cannot well be exaggerated; and the experience of the Crimean war showed that the want of an arrangement by which the soldiers of our army could have a substantial evening meal, was equivalent to an actual deprivation of food.

The British soldier takes three meals daily. The morning and evening meals, consisting mainly of farinaceous substances with liquids, are comparatively slight; the noon meal is the principal meal of the day.

This arrangement, so long as the soldier purchases the greater portion of the articles of food which he consumes, and is not confined to a limited quantity, may act well enough; but when he is dependent upon rations alone, as during a campaign, the case is different. For the arrangement of the meals is incompatible with a true economy of the rations, the more nutritious portions of the food not being sufficiently distributed throughout the different meals; the morning and evening meals are not substantial enough for the physical requirements of a campaign; and the amount of the rations, so long as the system of cooking commonly pursued in the army is continued, is not sufficient to furnish the soldier with three ample meals daily. Hence it was found necessary to augment the ration scale of our army during the Crimean war.

It would be well if our soldiers were taught so to arrange their food, that the morning and evening meals should be the most substantial meals of the day. Such an arrangement,

while it would enable the soldier to bear up better against the physical hardships of a campaign, would also contribute to the maintenance of a higher degree of health in the field, and many sufferings would in consequence be avoided.

The morning meal of the Turkish soldier consists of bread, and of a soup composed of rice and *yagh* seasoned with salt; the evening meal consists of bread, and of a stew formed of meat, rice, *yagh*, and vegetables, when the latter are issued. Twice in the week, when no meat is issued, *pillaff* forms the principal portion of the evening meal. Pillaff is rice cooked with fat, or butter. The rice having been boiled in water until softened, the superfluous fluid is poured off, and the grains are fully distended by exposure to a gentle heat. Then boiling fat, or butter, is poured over the rice, and mixed with it. The proportion of fat or butter in a pillaff should be sufficient to sheath each particle of rice; but the soldier, and the lower order of Turks generally, prefer the fatty matter in excess.

Well made pillaff is a satisfactory and substantial dish; and when richly flavoured soup is substituted for water as the agent for softening and distending the rice, the dish is most appetising. Pillaff, moreover, in the absence, or with a scanty supply, of meat, is not a bad campaigning dish. Its bulkiness is well fitted to satisfy the cravings of the appetite; the simplicity of its constitution is such that it may be readily prepared under most circumstances; and the materials of which it is composed are easy of carriage.

The bread used in the Turkish army is, when well made, sweet and palatable, although coarse, and, when practicable, it is issued freshly baked to the men every day. The ration-biscuit is exceedingly hard, but it is made of a finer and better flour than the bread. Before eating the biscuit, it is customary to break it into small pieces, and soften them by soaking in water, subsequently placing the fragments between a fold of damp cloth, or linen, and allowing them to swell.

When bread cannot be obtained, a quarter of an oke (eight ounces and a half) of flour is sometimes issued in lieu of biscuit. The men prefer the flour to the biscuit, as they can make a form of bread which is more grateful to the taste than biscuit. The usual method of preparing flour for food is very primitive, but it is suited for campaigning under circumstances when a supply of fresh bread cannot be obtained. The flour is mixed with water so as to form a paste of slight consistency. A portion of the paste is then spread out thinly upon an iron plate, and baked over embers. The cake thus made is termed

ufka: its taste is not unpleasant, and its appearance is similar to the thin oaten-cake of our northern counties, but the colour is darker.*

The Turkish soldier usually stews his meat, but occasionally he cooks it in a different fashion. One evening in June 1855, when the troops to which I was attached had bivouacked on the eastern bank of the Tchernaya, two men, from a battalion of Turkish rifles that had halted nigh at hand, approached a fire near to the spot where my tent was pitched, and prepared their evening meal. Each man had cut a small branch from a neighbouring bush, and this branch was first peeled, and cut to a point at one extremity. One of the men then drew from his haversack a portion of the intestines, and the other man produced a piece of the flesh, of a newly killed sheep. The soldier who possessed the intestine wrapped it, fold upon fold, round the branch he held in his hand, transfixing with the pointed extremity the last fold; and the other soldier having cut his meat into small pieces, pierced them with the sharp end of his branch, and fixed them one after the other upon it. A little salt was then sprinkled over the meat thus spitted, and one of the men even added some pepper, which, after much fumbling, he produced from a small paper parcel. The spits were then held, in the hand, over the fire until the meat was cooked, when the intestine was disengaged mouthful by mouthful, and the fragments of mutton were drawn one by one off the spit; and, with the addition of a large allowance of bread, each man ate his evening meal with avidity, and terminated it with copious draughts of water.

When Agamemnon feasted the "elder chiefs of all the Greeks, having pierced the entrails with spits, they held them over the fire. But then after the thighs were roasted, and they had tasted the entrails, they cut the rest of them into small pieces, and fixed them on spits, and roasted them skilfully, and drew them all off the spits." (*Iliad*, b. ii.): and when Nestor feasted Telemachus, and "the thighs were burnt and they had tasted the entrails, they cut the other parts into bits and fixed them on the spits, and roasted them, holding in their hands the sharp spits." (*Odyssey*, b. iii.)

* Froissart, writing of the manner in which the Scots carried on war in the time of Edward III, states that, "Under the flaps of his saddle, each man carries a broad plate of metal; behind the saddle, a little bag of oatmeal: when they have eaten too much of the sodden flesh, and their stomach appears weak and empty, they place this plate over the fire, mix with water their oatmeal, and when the plate is heated, they put a little of the paste upon it, and make a thin cake like a cracknel or biscuit, which they eat to warm their stomachs." (Vol. i, chap. xvii.)

Salted meat was not used in the Turkish army previous to the last war, when pickled mutton was from time to time issued to the soldiers. This mutton was exceedingly tough, and long stewing was required to soften it. Beef cooked in its own fat, with the addition of a little water, and kept in jars, was also occasionally issued. This form of preserved meat is termed *kavourma*, and it is a better and more palatable article of food than pickled mutton.

The cooking utensils used by the Turkish soldier consist of a circular thin iron plate, and a broad, shallow iron vessel, which is tinned within. One of each of these utensils is issued to every ten men.

In the preparation of a limited quantity of food, such a system of cooking should be adopted as will economise the food most, secure the whole of its nutritive properties, and adapt it best for the action of the digestive organs. These requisites are fully attained by the method of cooking commonly used by the Turkish soldier; and the system of stewing which he ordinarily pursues in the preparation of his food is that by which such requisities can be most readily fulfilled. The stew-pan wastes nothing, loses nothing, and its capacity is illimitable; moreover, no other cooking vessel can be so easily manipulated.

The Turkish soldier, inasmuch as the stew-pan is, as it were, his national cooking vessel, has an advantage over the English soldier. The English soldier is habituated mainly to roast or boiled joints, and to the preparation of vegetables in a simple and separate form, and no method of cooking is less calculated to economise his rations, or is more unfitted for the field. Indeed, if the rations of each soldier were issued singly, they would prove, as a rule, insufficient for the ordinary consumption of the man, so long as the method of cooking usually adopted in the army is persisted in, and it is only by the system of messing that such a shortcoming is avoided.

The evil results of a vicious system of cooking were very palpable among our soldiers during the last war. Their food was too commonly presented to the stomach in a form ill adapted for digestion, (considerable discomfort and suffering, if not actual disease, arising from this source alone), and the rations were partly wasted. The hard masses of badly boiled, roasted, or grilled meat, and of worse cooked vegetables, were most pernicious while the soldiers were exposed to the influence of those powerful miasmatic emanations which were peculiarly rife in the camp, and which predisposed

in an especial manner to intestinal affections.* It was a common observation among the healthiest soldiers, that boiled vegetables almost invariably passed through the intestines and appeared in the ejections nearly unaltered; and upon this ground alone the medical officers of some divisions, during the summer of 1855, advised the discontinuance of the ration of potatoes, lest the imperfectly digested vegetable, in its passage through the bowels, should excite diarrhœa or dysentery. Had the vegetable been cooked in such a fashion that it would have been reduced almost to a pulp, probably complete digestion might have been ensured, and the nutritive effects of this important article of diet might have been fully secured, while the evils resulting from the presence of crude vegetable matter in the digestive tract would have been avoided. A portion of the rations was lost, because the method of cooking necessitated a certain amount of waste, and the ration of one valuable article of food could not generally be made use of in a manner satisfactory to the palate. In several divisions the ration of rice was rarely drawn by the men, for they were not acquainted with a method of cooking which would give to it a grateful savour; and this valuable aid to the contents of the stew-pan (in which, while adding to the bulk of the food, the rice receives the flavour of the more sapid contents) was lost. Thanks to M. Soyer, some portions of the army, before the

* "Of the various causes operating in the production of disease amongst the troops in camp, the greater part tended undoubtedly to the development of morbid action in one part of the system more especially, and this almost to the exclusion of affections in other organs, at least in a primary form. The abdominal viscera were those in which disease was most commonly manifested. Physical causes from without, and irritation established within, in some measure, at least, connected with peculiarities of life and diet, led to a predominant tendency to gastro-enteric derangements, and the consequent development of the diseases known as fluxes, in their various forms. It may, indeed, be said, that the main features of the pathology of disease, as presented in the army of the East, were embraced in the two classes of the fevers and the fluxes; and of the latter, no inconsiderable portion owed their origin to the former. Ample proofs will be found, in the various following sections of this Report, of the extraordinary predominance of abdominal lesions. To such an extent did they prevail, that I believe I shall be warranted in stating, that in no case submitted to examination by me or my assistant has a perfectly normal state of the digestive viscera been found to exist; while a marked absence of lesions in other parts was, in those who died in the early periods of disease or injury, the general rule..... In no instance, in which a *post mortem* examination has been made by us, have the abdominal organs been found entirely free from disease. And these observations will hold good, not only in the case of those dying from acute or chronic disease, in which symptoms referrible to the abdomen were present, in a more or less marked degree, but also to all those cases in which death was the result of the shock of great mechanical injuries, or followed at an earlier period after the greater surgical operations." (Dr. LYONS' Report on the Pathology of the Diseases of the Army in the East, pp. xii, and 11.)

termination of the war, were taught better and more economical habits of preparing their food; but, owing to apathy on the part of the officers, and to a degree of obstinacy on the part of the soldiers, the good results of M. Soyer's instructions were but partial. Indeed, the dishes habitual to the soldier were not to be done away with during a brief campaign, and the field is not the proper place for tuition. Nothing is more essential to the maintenance of the soldier's health than a proper system of cooking; nothing is more important than a system which will enable him to husband his rations in the field, and add to them by any article of food which may chance to come to hand. The stew-pan is the only means by which such an end can be readily attained; but the use of the stew-pan and its capabilities, and a taste for the dishes which can be prepared in it, must be taught systematically to the soldier in times of peace. The soldier should be drilled in the mysteries of the stew-pan as well as in his manual exercise.

Water is the chief drink of the Turkish soldier, and he consumes large quantities of it; but, not unfrequently, he shows considerable indifference to its quality. In the field, his inattention to the precautions necessary for the protection of the springs from which he drew water, often led to their pollution. The Turkish hospital, at Balaklava, was supplied with water from a spring about two hundred yards distant from the hospital. At first the hospital attendants and guard drew water, along with the British soldiers stationed in the vicinity, from a spring at a greater distance from the hospital, but more easy of access. It was discovered, however, that the Turkish soldiers were in the habit of washing their cooking utensils, and even cleansing their foul linen, in the water at the spring-head, whereupon, a British sentry was placed near the spring, and the Turkish soldiers were forbidden to draw water from it. They had recourse then to a well from which a copious supply of excellent water could at all times be obtained, and which was nearer to the hospital. No control being exercised over the Turkish soldiers at this well, the water became in a short time irretrievably polluted. The men washed their linen, and cast out water, unnecessarily, upon the brink of the well, and the ground in the immediate vicinity was converted into a deep slush, which oozed through the interstices of the stone-work, and trickled into the water. No attempt was made to remedy the evil, and at last the water became offensive even to the smell. Yet this was the only source from which the supply of water for the hospital was drawn for several months, notwith-

standing that two or three small unused springs existed on the plateau near the hospital. Once, indeed, when the water had become highly offensive, an attempt was made to discover a spring which had existed very near the hospital, but which had been lost in consequence of the formation of a burial-ground, belonging to certain of the British forces on the heights. An exploration was commenced near the lower border of the burial-ground; but, fortunately, the spring was not discovered, for I subsequently ascertained that the water, diverted from its original course, permeated the graves, and traversed the burial-ground near its centre.

Even the springs contiguous to the head-quarters encampment, and immediately under the eye of the commander-in-chief, were ruined by the filthy habits of the soldiers, and it was necessary for the men to procure water from wells half-a-mile distant from the tents. The banks of a copious spring, in a hollow on the verge of the encampment, was used as a latrine, and a depository for carrion.

Spirit-drinking is so rare a vice among the Turkish soldiers, as scarcely to merit a passing notice; but the officers are not so free from the pernicious habit, and with them it assumes its worst form, the spirit (of whatever kind it may be) being drunk pure, and often in large quantities.

Coffee and tobacco are the two great luxuries of the soldier, but he has to provide them from his own resources. The coffee is used after the fashion of a cordial. It is prepared, generally from the freshly ground and recently roasted berry, as a strong decoction, of which the dregs form one-third or one-half of the whole bulk. A quantity of this decoction, equal to about one ounce, (without either sugar or milk,) is commonly taken at one time, and the dregs are swallowed along with the liquid. This is the usual mode of drinking coffee in Turkey.* Tobacco is used according to the fancy of the individual; but the soldier often passes long intervals without it in the field, and he suffers much less discomfort from the deprivation than would be ordinarily supposed.

The Turkish soldier has great tact in economising his fuel—a tact arising from habit, wood and charcoal being almost the only kinds of fuel used in the Turkish empire. The Turk

* The introduction to Dr. Wagtail's disquisition on the verb *drink* may be fitly applied to the Turkish method of taking coffee. "The verb *drink*", as the learned doctor affirmed, "was improperly applied to the taking of coffee, inasmuch as people do not drink, but sip, or sipple, that liquor; .... the genuine meaning of drinking is to quench one's thirst." (Roderick Random, chap. xlv.)

rarely uses a fierce heat in cooking, and, over a handful of embers, he will perfect excellent dishes. The process of cooking with a gentle heat may require more time, but not so much as to militate against the advantages to be derived from the better method of preparing the food. A hole, about six inches in length, and five in breadth, formed like a horse-shoe, and dug into the side of a bank, or an enclosure of similar form and size, built up with clay and stones, is the usual fire-place of the Turkish soldier in the field, and it answers every purpose of economy and usefulness. The daily issue of fuel to the soldier is three hundred drachms (about thirty-four ounces) of wood, and the same amount of charcoal. This is a much more liberal ration than that which is allowed to the British soldier. The daily ration of fuel for each man in our own army is twenty-four ounces of wood, and twelve ounces of coal.

(To be continued.)

SANITARY LEGISLATION A FIRST DUTY OF A GOVERNMENT.

By BENJAMIN DANIEL, M.R.C.S., L.S.A.

THAT the improvement of our existing social condition is the knotty problem of this age; that hygiene is an agent of extensive power in its influences upon the physical and moral conditions of a people; and that it is the only expedient by which the crowded inhabitants of cities can be maintained in health and vigour,—these are strong reasons why sanitary legislation should form a first duty of a government.

It says little for real progress, that, after eighteen hundred years of Christianity, we should still be asking the old question: How much of the disease and vice we see surrounding us, depends upon our exclusive devotion to material prosperity, and on our habitual disregard of humanity, save as so much working material of fluctuating value, to be regulated by the law of supply and demand? Our large towns are filled with hospitals for the sick, with juvenile reformatories, female penitentiaries, and adult criminals' aid societies. There is an ointment for every sore. Meanwhile the weeds in our garden of civilisation grow on apace, faster than our gardeners can root them out. They threaten to overrun our most daintily cultivated flowers, and to appropriate for themselves those elements of the soil which, without the protection of the vigilant horticulturist, the fairer and tender plants cannot maintain for themselves.

There is no class whose pursuits more frequently call them into the presence of social evils than that which is engaged in the profession of medicine. There are no classes of men more fitted to analyse these results, and to trace them to their origin, than they who are habitually engaged in tracing diseases to their source.

The vocation of the physician is not that which excited the ridicule of the humorists and satirists of bygone days. He need no longer be ashamed to confess the impotence of his art to remove what is the opprobrium of society, namely, the diseased products of want and misery on the one hand, and of wealth and luxury on the other. How frequently does it occur to the observing physician, to regard the human suffering which comes before him with feelings of distress, if not of despair! How frequently does he lament the inability of his art, and the impossibility of eradicating morbid results, the seeds of which have long since been intermingled and sown broadcast among the very germs of life!

Registrars' returns inform us that not half the children born alive attain the age of twenty years. An average obtained by assurance societies, gives the following results:—

Of 1000 living children born, there remain alive—

At 10 years.....	534	At 50 years.....	307·5
20 „	485	60 „	229·9
30 „	424	70 „	133·6
40 „	370	80 „	44·7
		100 „	1·2

Of 10,000 living children born in England, only 8,461 are alive at the end of the year; and of the deaths the poor of the large towns contribute the greater share. Thus, as Hamlet might say, we have a massacre of innocents every day in the year, if we could but see it. Despite of our virtues, our magnanimity, and our power, civilisation nevertheless extorts from us the sacrifice of its holocausts of silent victims.

But physical evils are not the only ones which demand the medical man's attentive consideration. There is a crop of moral evils which grow on a physical soil, and which can only be remedied by physical means. The truth is, we must not be of those who rob the widow of her mite, and for pretence make long prayers. Religious exhortations, unaccompanied by good works, will never effect much real improvement amongst the masses. The question is asked—What is to be done with our criminal population? The culprits, by their increasing numbers, are becoming unmanageable. Society, too, has some compunction about chastising its illegitimate offspring, and would persuade

them to be good; if not, society has no alternative but to shoot, hang, or imprison the malefactor. In the meantime, it is a proper question to ask—How much of the causes of depravity and vice are within the control of legislation? Are the ruling classes, while they are professing the public good, really availing themselves of every known means of elevating the moral standard of the people whom they govern? It is an incontrovertible fact, that the result of adverse circumstances will be impressed on the physical organisation. Crime has a physiognomy of its own, with a forehead villanously low. This faulty organisation, I have no hesitation in saying, is, in numberless cases, a simple result of external influences. And these influences, whatever they may be, are capable of modification by good or by bad government.

How comes it that we have so disregarded the sacred writings of the first dispensation? Is there no meaning in those minute sanitary regulations which abound in them? I am afraid that in our overweening self-complacency, we are apt to think too much of our own wisdom and philosophy, and to neglect many simple lessons of antiquity, of which bitter experience alone can teach us the value. In these ordinances the sanitary reformer perceives a recognition of the high importance which the physical constitution occupied in the divine law; and daily experience of the intimate alliance existing between our moral and physical state, proves how far-seeing was that legislation, which, from the cradle, inculcated on the nation sanitary precautions and cleanliness, as essential parts of its religious duties.

In all laws, which have for their aim human improvement, man must be considered as a whole. It will not do to cut him up into sections, material, spiritual, or intellectual, or to develope any one part at the expense of those which remain.

It must not be objected to the medical reformer, that he too strongly insists on the moral necessity of arrangements conducive to bodily welfare, and that his views are materialist; for while his daily experience shows him the constant action and reaction between the mind, the body, and the emotions, he is open to confess his utter ignorance of their essential nature. The chemist can manipulate his materials, can analyse or combine, but he can only theorise as to the rationale of the causes of the results. He cannot either form or destroy an infinitesimal atom. However he may endeavour to fix it, it will speedily assume one form after another. Matter in every shape is as incomprehensible as mind, and its changes and phenomena are

as subtle and mysterious. It is the true Morpheus, an ever-changing indestructible essence, wandering through the physical world, at one moment forming an integrant particle of the chalky cliffs of old Albion, at another showing the "metal of her pasture," in the bones and the sinews of her sailors. We can follow the circulation of particles of matter, even in the "sweet south-west wind breathing on a bank of violets, stealing and giving odour." It is not for us to seek to dogmatise on the hidden mysteries of nature. We have nothing to do with theories. Common observation teaches us that, under favourable auspices, humanity thrives and becomes the paragon of animals, whilst, under the pressure of adversity, it descends lower and lower in the scale of degradation.

It is no arrogant assertion to say that a knowledge of the laws of nature enables us to modify organisation. Such an application of science is made extensively available by the breeders of horses, oxen, sheep, etc. If as much care were bestowed on the breeding of men as upon the breeding of cattle, we should not have books written on the degeneration of the human race.

It is a well known fact, that the condition of the labouring classes in towns, if not in the country, is pregnant with the sources of disease. Consumption, scrofula, fever, reckon their victims by thousands. Nor are the wealthier classes exempt from their peculiar ailments; but these, such as heart-disease, dropsies, apoplexies, diseased livers, etc., are rather the consequences of repletion than of exhaustion. It is stated on French authority, that the artisans of towns become extinct in the third generation. The manner of life in manufacturing and commercial towns is so injurious to their population, and the drain upon life so exhausting, that were it not for the constant immigration of fresh blood from the country, it would gradually be used up. How is it that while we are pursuing wealth and power we should be neglecting our population, or be seeking to rid ourselves of the most vigorous part of it by extensive emigration? In the late war men were scarce; we had to recruit and form bands of foreign mercenaries, whilst we allow half our children to die in infancy, and our people to be decimated in their dwellings by preventible diseases. Yet authority is not wanting to show that we are thus pursuing a suicidal policy. Lord Bacon says:—"Neither is money the sinews of war (as it is trivially said), when the sinews of men's arms in base and effeminate people is failing, . . . as for mercenary forces, which is the help in this case, all examples show, that whatsoever estate or prince does rest upon them, he may

spread his feathers for awhile, but he will mew them soon after."

Sanitary reform, otherwise the physical improvement of the nation, thus broadly stated, is synonymous with real social progress, and constitutes a policy alike radical and conservative. It offers a solution of many difficulties and dangers which beset established institutions. The author already quoted says:—"As for discontentments, they are in the politic body like humours in the natural, which are apt to gather preternatural heat and inflame." It may, however, be truly stated, that humours in the natural body do really beget political discontentments. St. James asks:—"From whence come wars and fightings among you? come they not hence even of your lusts that war in your members?"

Society is the aggregate representative of individuals. It may be likened to the liver, which is an agglomeration of small livers; to a muscle, which is composed of myriads of smaller muscles—fibres and fibrillæ, each of which has its own proper and inherent power of contractility. When unanimous, they all pull together and exert their influence on one common tendon. Should anything interfere with the regular action of these minute organs, the whole machine goes wrong. Their functions are performed painfully and irregularly. When the health of the human body is impaired, it gives rise to many morbid cravings, and excitement becomes a necessity to extinguish physical and moral discomfort. Montaigne speaks of a soldier so remarkable for bravery, as to attract the notice of an emperor, who, on speaking to him, and finding him troubled with a painful and miserable disease, immediately charged his own physician with his cure; but no sooner were his health and comfort restored, than he quitted the profession of arms, his life being more precious to him now that he had some pleasure of his existence. It is a bad thing for a state when the pressure upon the people is so great, that the healthy requisites of existence are wanting to them. Who are the men of barricades? Not the well fed, warmly clad, snugly housed citizens. But they are the rabble of the *fauxbourgs*; dirty, ill fed, houseless vagabonds, like Falstaff's army, fit food for powder only. Comfortable people have something to lose, and are not over fond of fighting. Have not urgent private affairs superseded all other considerations of honour, glory, or patriotism, when the character of our country has been at stake?

Sanitary science may be unnecessary among a healthy vigorous people, inhabiting a wide and open country, or living

amid the natural glories of mountains and valleys, woods and streams. Such an existence is compatible with the highest physical perfection. It is, however, quite a different thing when we have to deal with a people immured in brick and mortar, earnestly pursuing wealth, or seeking a livelihood at the expense of life itself. It is sanitary science, founded on the laws which regulate health, that calls upon the government to adopt measures which nature itself teaches to be necessary for the proper development of humanity. Where, in the existing state of society, radical reforms cannot be effected, it suggests the means by which existing injurious influences may be alleviated or counteracted. With other things, observation teaches us, that variety of employment is necessary to prevent a man from degenerating into a mere machine; hence the necessity for shortening hours of labour, and permitting an opportunity for intellectual and moral improvement. Particular exercises develope particular faculties. Excellence will be found, however, in a well maintained equilibrium between the mind, the body, and the passions. All else is extravagance and monstrosity. Athletes of various kinds are specimens of exaggerated development, and show the effect of training, but they are not to be regarded as samples of civilisation. We place in the same category all intellectual giants, who pursue the development of the faculties of the mind at the expense of the body, and very often of the mind itself. How many geniuses have there been whose genius has carried them to the verge of insanity? The laws of life teach that each individual may be endowed, as it were, with a certain amount of power; that in using it we should act economically, and not draw upon it too much in one direction, seeing that what we gain one way we are likely to lose in another. A great deal depends upon education and habits, and these are, more or less, dependent upon good or bad laws. The pleasures of science and of the imagination have been dilated upon by lordly lecturers; but what absurdity it is to expect, when a man's life alternates between the hovel and the workroom, that he should forget his actual miseries, revel in transcendent dreams of happiness, or plume himself on the dignity of humanity. The study of philosophy, and the curiosity which inquires into the essence of our nature, are pleasing to a man who can sit in a well stuffed morocco-lined easy chair, in a quiet and snug library. It may afford him intellectual gratification sweeter than the daintiest luxuries of the palate. But a man, surrounded by the *res angusta domi*, at his wits' end to get himself and family bread, is not in a fit state

for such quiet and comfortable enjoyment. Before intellectual or moral improvement can be expected, the pressure of existence must be made less, and some of the more glaring physical impurities which beset the poorer classes must be removed.

In English papal times, the church probably owed some part of its efficiency to its extensive almsgiving. I believe that if the religious system of relieving the poor, which prevailed in monastic times, could be compared with that which has, from the reign of Queen Elizabeth to the present day, been pursued by our municipal authorities, the latter would gain nothing by the comparison.

The physical regeneration of the people is a necessary basis of all moral and intellectual improvement. I cannot understand how a healthy mind in a healthy body is to be expected, when the working classes, from their poverty, are crammed into over-crowded dwellings, the air of which reeks with uncleanness, while the inmates are allowed, if not obliged, to feed on food and drink compounded of the most abominable adulterations.

Is there any wonder that creatures existing, and children begotten and reared, under such circumstances, should have little respect for our social institutions? Can it be doubted that this degrading poverty is the fruitful source whence our gaols, hospitals, and workhouses are filled to overflowing? There is a class continually increasing in numbers, to whom may be said—

"The world is not thy friend, nor the world's law."

It was the first Bonaparte who said that European wars were social wars. He despised the *ideologists*, and considered the sword the readiest solution of social difficulties.

The policy of the government of every country will always be the social amelioration of the people; and to this there is no auxiliary more important than that which, in relieving the burdens of the people, makes the healthy requisites of existence more accessible to them, while, at the same time, it teaches them to avoid that which is pernicious, and select that which conduces to their physical welfare.

NURSERY GOVERNMENT IN ITS SANITARY ASPECTS.

By T. HERBERT BARKER, M.D., F.R.C.S.

(*Continued from* vol. ii, p. 373.)

CLOTHING OF CHILDREN. 1. *General Observations.* In every period of life, health depends, in a great measure, on the equable diffusion of warmth over the whole body; and this cannot be insured, in our variable climate, without special care in clothing. Yet it is possible that some reader, pointing to the children of the poor, thinly clad, and often rudely exposed to the weather, may ask, "Are not some of those who are most exposed robust and healthy?" I reply, that such exceptions, when duly considered, will only serve to confirm the rule I have laid down. It is necessary, however, to refer to these cases, because on a few supposed instances of the beneficial effects of exposure, some persons have grounded an absurd and mischievous theory of "hardening" children. To meet these theorists with facts, I refer to the register of deaths, where it is found that, of children under seven years of age, there is a much greater mortality among the poor than among the rich. Although I am aware that there are other fruitful sources of mortality among the children of the poor, it cannot, I think, be reasonably doubted that cold, or the want of suitable clothing and shelter, adds greatly to the number of early deaths.

But a reference to the provisions made by nature for the warmth of young animals will best serve to refute the advocates of the "hardening" system. Let us notice the covering of soft warm down on the chicken (which preserves heat better than the feathers which are afterwards developed), or observe the hair on a young foal, which is both softer and warmer than that of the full-grown animal; and from these and numerous similar circumstances, we may learn that the rule of nature is to take especial care of the temperature of young animals. If the study of clothing, then, is generally important, it is especially so with regard to the health of children. In my remarks on clothing and temperature, I would recommend a middle course between the two extremes to which many infant lives have been sacrificed—the "hardening" process on the one hand, and the dread of fresh air on the other.

As nature strengthens the child, we may second her efforts

by exposing it to such moderate degrees of cold as its constitution is well able to resist; but we must by no means expect that a child, naturally feeble, will be hardened and invigorated by a want of sufficient clothing, or a pitiless exposure to extreme cold. It is obvious that a young and feeble child must require more clothing than one older and stronger, who can take vigorous exercise.

Our observations on this point are confirmed by a reference to the statements of able physiologists. Dr. Edwards has shown by experiments that the natural heat of mature infants at birth is from 3° to 5° below that of adults (the heat of premature infants is still lower), and that the power of producing heat is at its *minimum* at birth. The practical deductions from these facts are obvious—that the newly born infant should be warmly wrapped in flannel; that during cold weather it should be dressed near a comfortable fire; and that all other proper means should be used to preserve a due degree of warmth. "Instinct," says Dr. Edwards, "leads mothers to keep their infants *warm*, though philosophers, by more or less specious reasoning, have at different times and in different countries induced them to abandon this guide, by persuading them that external cold would fortify the constitutions of their children as it does those of adults."* The same writer, in treating of mortality from *cold*, observes—"It is not confined to children whom the misery of their parents cannot guard from the rigour of the weather, but it also operates, to a great extent (without being either perceived or suspected), in families enjoying affluence, and where it is believed that the necessary precautions have been taken; because *cold*, being relative, it is difficult from our own feelings to judge of its effect on others, and because it does not always manifest itself by determinate and uniform sensations. They do not feel the cold, but they have an uneasiness or indisposition arising from it; their constitution becomes deteriorated by passing through the alternations of health and disease, and they sink under the action of an unknown cause. It is the more likely to be unknown, because the injurious effects of cold do not always manifest themselves during or immediately after its application. The changes are at first insensible; they increase by the repetition of the impression, or by its long duration, and the constitution is altered without the effect being suspected."

For further proof that it is not the children of the poor

* Dr. EDWARDS on the Influence of Physical Agents on Life. Translated by Drs. HODGKIN and FISHER.

only who suffer from cold, we may quote the remarks of Drs. Evanson and Maunsell: "We wish," say they, "we could adequately depict one of those miserable victims of parental vanity whose appearance in our streets will sometimes, on a March or November day, strike cold into our hearts. The cap and feathers set upon (not covering) the child's head, and probably of a colour and richness contrasting mournfully with the blue ears, sharpened nose, and shrunken cheeks (in which cold has assumed the features of starvation); the short kilt and Highland hose, exposing between them cracked and quivering knees, altogether require for their description more graphic power than we can presume to lay claim to."*

As a fact worthy of notice in this place, I may quote a well authenticated statement that, during cold winters in Italy, it has been observed that many deaths of infants resulted from the practice of taking them to be baptised in cold churches; as soon as the clergy put in force their new orders to baptise young children at home during severe weather, the amount of infant mortality was greatly abated.

MM. Villermé and Milne-Edwards have shown that both extreme heat and cold are highly injurious to the infant, and that the mortality among infants is considerably increased during the months of January, February, and March, when we commonly have the most inclement weather.

The statements of these distinguished scientific men are confirmed by Dr. Caffort, of Narbonne, whose tables of mortality of children, in Narbonne, show the following figures:—Average mortality, 1 in 9·57; in January, 1 in 9; in April, 1 in 10; in May, 1 in 17; and in June and July, from 1 in 7 to 1 in 8. Still more convincing facts are observed in Russia, where the number of deaths of infants increases rapidly from the more temperate to the severer latitudes. In Russia—taken as a whole—the mortality among children exceeds that among persons of all other ages taken collectively; and, as we advance from the mild temperature of Courland to the rigorous climate of Tobolsk, we find, at the latter place, the ratio of deaths *almost doubled*. These are facts—and many others might be added—which demonstrate the cruel absurdity of the so-called "hardening system," which exposes tender infants to extreme cold.

* A Practical Treatise on the Management and Diseases of Children. By Drs. Evanson and Maunsell.

I must return to this topic, deficient clothing, in my special remarks; at present, I have to consider another very serious evil, and one far too common—the habit, namely, of wearing certain parts of clothing so *tight* as to interfere with the circulation of the blood and the development of the muscular system. Of this evil the most injurious instance is found in *tight-laced stays*, as worn by young ladies; but some other cases also require notice. Even infants are frequently found, suffering simply from the effects of tight clothing, while their indications of pain are referred to other causes. I have been called to attend infants, apparently labouring under general indisposition, with restlessness, embarrassed breathing, sickness, and a dusky hue of the skin, in place of the rosiness of health, and all this the effect of a too tight application of the band, or of some ill fitting article of dress; and, greatly to the surprise of both mother and nurse, a cure has been soon effected in such cases, simply by loosening the dress, without any medicinal administration. Tight-waisted trowsers for boys, and stays of all kinds for girls, should be interdicted during the whole period of childhood, nay, of life. But the evils of *stays* are of the most serious character. Besides crippling muscular action, their continued pressure alters the shape of the chest, diminishes the capacity of the lungs for air, forces the stomach, liver, and spleen, from their natural positions, presses these upon each other, and diminishes their functional power. As an inevitable consequence, this produces derangement of the respiration, the circulation, and the digestion, and too often leads to an early grave, or to a life of prolonged ill health. All these effects, too clearly and too frequently demonstrated in the *post mortem* science, surely indicate penalties too dear to pay for the sake of complying with the absurdities and cruelties of fashion. We scoff at the Chinese for crippling the feet of their ladies; while a still more unreasonable custom prevails among ourselves. If "fashion" *must* be allowed to do violence to some part of the human frame, then by all means let the feet be given into her service, not the heart and the lungs. "It is generally thought that stays improve the shape. There cannot be a greater mistake."* We shall conclude our remarks on this topic with a quotation from the *Report of the Registrar-General of Births, Deaths, and Marriages:*—

"The higher mortality of Englishwomen by consumption

* Coulson, On the Injurious Effects of Tight Lacing.

may be ascribed partly to the in-door life which they lead, and partly to the compression, preventing expansion of the chest, by costume. In both ways they are deprived of free draughts of vital air, and the altered blood deposits tuberculous blood with fatal and unnatural facility. *Thirty-one thousand and ninety Englishwomen died in one year* (the year ending June 30, 1859) of this incurable malady! Will not this impressive fact induce persons of rank and influence to set their countrywomen right in the article of dress, and lead them to abandon a practice which disfigures the body, strangles the chest, produces nervous and other disorders, and has an unquestionable tendency to implant an incurable hectic malady in the frame? Girls have no more need of artificial bones and bandages than boys."

II. *Special Remarks on Clothing for the Head, Chest, Abdomen, and Limbs.* As a general rule, we may observe that the *head* should be kept cool. It is so well protected by nature, that, excepting to guard it from draughts and extreme cold, it requires but little care. Yet we sometimes find the head jealously guarded from cold, while the parts of the body more susceptible of injury—the chest and the feet —are left with insufficient protection. The *chest* and the *abdomen* should be kept warm, in order that the blood may not be repelled from the surface, and driven in undue proportions upon the internal organs. While the infant is unable to take that exercise which in after life serves to maintain a vigorous circulation, it is highly important that the body should be thoroughly protected from cold and changes of temperature. For this purpose, no sort of clothing is so suitable as Welsh flannel of the finest and softest quality. The infant cannot be dressed better than in flannel sufficiently long to fall some nine or ten inches below the feet, for the first four or five months. After this period, when the child is able to exercise its limbs, and it is desirable to shorten the clothes, woollen socks or stockings should be substituted.

When the child is older, and can take exercise in the fresh air, the continued use of flannel next the skin has this great advantage, that the fresh air can be enjoyed more freely in various weather, without risk of taking cold. In cold weather, woollen gaiters should be drawn over the legs when the child is exposed to the open air. No other clothing can be a sufficient substitute for flannel; but we may remark here, that cotton, being considerably warmer than linen, is more suitable for children.

Here a remark may be added respecting change of gar-

ments. The extra clothing in which exercise has been taken should not be immediately and altogether removed while the child is very warm or perspiring. Much of the disrepute into which warm clothing has been brought by some, may be attributable to the mischief which undoubtedly arises from abrupt changes of dress. The limbs should be free from all bandages and ligatures, and the whole clothing should be so loose that there can be no restraint on the movements. It is advisable, too, that the articles of infant dress should be tied rather than pinned. Attention to this suggestion will probably prevent much discomfort, and even danger.

The custom of exposing the whole of the neck and the upper part of the chest in the young female ought to be severely reprehended. It cannot be practised without serious risk in our changeable climate, and especially when other habits tend rather to make the body susceptible of cold than otherwise. Boys should wear warm double-breasted waistcoats in winter; this is preferable to the use of hair-skin. Respecting night-dresses we may observe that, in the winter, if children have the habit of throwing the bedclothes from them, a flannel night-gown may be used; in other cases, one of calico will be sufficient.

The trousers worn by little girls, and by boys before they are breeched, are too commonly made of very flimsy materials, affording hardly any warmth. Flannel or jean should be used for these parts of clothing.

The *feet* require especial care to preserve them from cold and damp. When the extremities—the hands and feet—are habitually allowed to suffer from cold, the circulation is necessarily unequal, and there must be some risk of producing injurious effects on some of the internal organs, particularly the brain, the lungs, and the bowels. I have repeatedly observed the happy effects of careful attention to the warmth of the extremities, in relieving the embarrassed functions of the internal organs. In the winter season, the shoes should be thick and perfectly waterproof. When a youth is delicate, double soles, with a layer of cork or bladder between them, are advisable.

Wet feet are a most frequent source of cold; therefore, when, on returning from exercise, the feet are in any degree damp, the shoes and stockings should be immediately changed. Soles of *gutta-percha*, or overshoes made of India-rubber, may be recommended here, as excellently adapted, not only to keep the feet dry when the ground is wet (as after a thaw of frost or snow), but also to fence the foot against the cold

in the most secure mode possible. Care should be taken that all shoes and boots are made easy to the feet. Corns, bunions, etc., which are almost always the effects of tight or ill fitting shoes, may be avoided by early attention to the comfort of the feet. Shoes must be preferred to boots, as the latter, especially when made with stiff upper leathers, impede the motions, and consequently confine the symmetrical growth of the ankle-joints and other parts.

TEMPERATURE. In the section on clothing, I have anticipated some of the practical remarks which might have been given under the present title; but a few additional observations may serve to confirm the opinions already stated regarding the effects of warmth and cold.

In the first place, I may again notice a popular fallacy to which reference has been made in my remarks on the "hardening" system of training children. I allude to the belief that exposure to heat always renders the body more susceptible of the ill effects of cold. There is some slight bsais of fact in this common opinion; but it is by no means true in the unrestricted sense in which it is often understood, while the inferences drawn from it are both incorrect and mischievous.

To clear up this matter, I will first give an instance of a fact which seems to support the common notion. A boy, after engaging in violent exercise, so as to produce free perspiration, sits down to rest in a current of cold air, and remains there until his body is chilled; the consequence doubtless is, that he suffers from that obstruction of perspiration which we term "a cold". Now, observe, the mischief here arises, not from the fact of a sudden change of temperature (as in passing from a warm conservatory into the cool open air), but from the fact that the body is exposed to a greater degree of cold than it is able to resist. It by no means follows that the boy would have suffered in the same way by leaving a warm parlour and walking a mile or more exposed to the keen frosty air of a winter's morning. Why? Because, by the store of warmth accumulated in his system while he sat by the parlour fire, he is now well able to resist the degree of cold to which he is exposed.

I might easily support this doctrine by reference to numerous undoubted facts. One is too conclusive to be passed over. If any people ought to know the proper means of resisting cold, it must be the Russians, and other inhabitants of the frozen North. Now, the Russians and other natives of northern countries preserve, by means of stoves and double

doors and windows, a very high degree of heat in their houses during winter, and yet leave them with impunity to pursue their occupations in the open air. One of their common practices is to leave the vapour bath, and, while in a glowing and steaming condition of heat, to roll themselves in the snow.* Dr. Edwards also found, experimentally, that "in exposing animals to successive applications of cold, their temperature fell the more slowly the longer they had been subjected to the influence of warmth." From this he deduces the obvious consequence—"that those who are liable to frequent exposure to severe cold, are rendered more capable of supporting it by subjecting themselves in the intervals to a high temperature."

The nursery should not be kept at an immoderately high temperature. In winter, the heat should not exceed 60° Fahrenheit. A *good* thermometer (this precaution is necessary, for the instruments commonly sold are often found to be worthless) should be considered an indispensable appendage to the nursery. In recommending the use of a *thermometer*, I do not intend to imply that all its minute variations must be attended to, so as to lead us to alter the dress or abridge the open air exercise of children on account of slight changes of temperature; but this simple instrument might with great advantage be more generally used to indicate the more important, or the wider and more abrupt, changes from heat to cold, and *vice versâ*, to which our climate is so liable.

It is not generally understood that the temperature of morning and evening in spring differs in an important degree from that of the same hours of the day in autumn. In April, the mornings and evenings are cold, because, in the absence of the sun, the damp and cold soil speedily reduces the temperature which the air has acquired during the day. In October, the mornings and evenings are comparatively warm, because the soil, warmed by the summer months, does not so soon depress the temperature of the air. This is one of the facts indicated by the thermometer, and is evidently one of some practical interest to delicate persons, and those who have the care of children.

I am so far a believer in the injurious effects of the *east wind*, that, during its prevalence, I would recommend especial

* "The common winter temperature of houses in St. Petersburgh is 64° Fahrenheit; whereas, out of doors, it is frequently as low as — 20°." (Dr. Granville's Travels.) For many useful observations on temperature, the reader may consult a valuable little essay, entitled "Thermal Comfort", by Sir George Lefevre, M.D.

care to be taken with regard to temperature and exposure to cold. If there is in our climate any time (excepting heavy rains or snow storms) when we would intermit daily exercise in the open air, it is when a keen easterly wind is blowing. I am inclined to think that, after all the numerous observations which have been made upon it, there is still something in the east wind which has not yet been sufficiently explained. Its peculiar, benumbing, and deadening influence upon animals, and especially upon *fish*,* is very remarkable. Some of its effects, however, may be at least partly explained. The peculiar chillness which it produces, so annoying to persons of a rheumatic habit, may, in a great measure, be traced to its extreme dryness. This causes rapid evaporation from the skin, and consequent cold. The dew-point in spring, and during an easterly wind, is frequently many degrees below the temperature of the air. The effect of such a state of dryness is parching in the extreme to the skin of animals, as well as to the leaves and blossoms of plants. The low dew-point permits the temperature to sink greatly below that of the day, and this increases the injurious nature of the night air in spring.

Such sudden and considerable changes seem to require modifications of our bed-clothing during the night, as well as of our body-clothing during the day. Yet, the general mode is to have one fixed quantity of covering for the bed in summer and another for the winter, while we neglect other and more abrupt changes. In the case of children, the injury likely to result from such transitions may, in a great measure, be prevented by the use of suitable night-dresses, made *long;* of linen in summer, but of calico in winter. When the nights are very cold, young children may be still further protected by a light warm shawl crossed over the chest, but not so tightly as to interfere in the least degree with respiration. I may add that, if linen bed-clothing be used in summer, it will be well to substitute calico for the winter.

Air. As the important influence of fresh air, or ventilation, in the management of infancy, claims some further notice, beyond the incidental allusions to it already made, I propose to give a few concise observations upon it in a distinct section.

* It is a fact well known by all experienced anglers, that during an east wind, even when the weather is not severely cold, fish generally refuse to take a bait. The *perch*, styled a "bold" fish, and the voracious *pike*, seem to have lost their appetite at such a time. There may be exceptions; but such has been the rule observed ever since the days of Izaac Walton, who prays "that the east wind may not blow" when his disciple goes "a fishing."

The most obvious means of securing a good ventilation (which must be understood as quite distinct from any thing like a violent and chilling draught of air) are, first, a sufficient number of windows for the size of the room; and second, an open chimney. Where these simple means are found not sufficient to produce a free ventilation, we may recommend the excellent "ventilator" invented by Dr. Arnott, which may be fixed in any room at a slight cost, and has, we believe, no accompanying disadvantages. It is obvious that a large room has its advantages; that the windows of a nursery should be thrown open when the children are not there, and, in fine weather, should be frequently partially opened when the children are there. A change of rooms is very desirable, when children are long confined to the house from inclemency of weather. In short, let it be understood well, that a supply of pure air is as much needed by the lungs of the child as the supply of wholesome food is required by the stomach, with this important difference—that, while in the latter instance, the demand is only occasional, in the former it is perpetual. Gymnastic exercises in the nursery are useful; but they must never be regarded as a sufficient substitute for the natural play of children in the open air.

SLEEP. It is one part of the beautiful arrangements of nature, respecting the infant, that it should be *gradually* introduced to the activity and excitement of life. Accordingly, we find that the early period of infancy is passed in *sleep*, and that (apart from disease or uneasiness, resulting from circumstances,) the only natural interruption to repose is the feeling of hunger. The lesson to be deduced from this fact is obvious,—that all unnecessary interruptions of the child's natural state of rest should be avoided.

When a child shows sleeplessness, we have reason to suspect some disorder of the stomach or bowels. When the latter are sufficiently open, the motions are of a healthy bright yellow colour, and free from *mucus*. Flatulency will often be found to be the cause of want of sleep; and, in this case, an occasional dose of rhubarb and magnesia, or of castor-oil, will generally prove the most suitable kind of composing medicine.* I, of course, suppose that every judicious mother will ask the advice of her medical attendant before she employs the dangerous powers of any *opiate* preparations, for the purpose of procuring sleep for the child, and quiet for herself.

* Twinberrow's lemon-peel-flavoured castor-oil is an excellent preparation for infants and children.

Leaving the period of early infancy, I must say a few words on the great importance of training the child to regular habits in retiring to rest. Six o'clock in the winter, and seven in the summer, are suitable hours, and nothing should be allowed to interfere with the regular time allotted for sleep. Children who are frequently allowed to stay up late (as a treat!) become feverish, excitable, and more and more indisposed to retire to rest at the proper time. With regard to the amount of sleep to be allowed to a child, no exact rule can be laid down—for one child may require more than another; but when a child is trained to go to bed soon after its last evening meal, and is permitted to sleep without disturbance, and wake of its own accord, then, if the waking hour is found to be too late, we may conclude that the hour of retiring to rest has not been sufficiently early. Early rising cannot be successfully inculcated without strict attention to regularity in going to bed. During the period of boyhood, (or from eight to fifteen years of age,) the hour of retiring to rest should not be later than *nine*. We may then reasonably expect the boy to rise, perfectly refreshed and invigorated, at *six* in the morning. Let it be remembered, that not merely physical health, but character and success in life, may depend on the inculcation of these regular habits.

The material employed for the beds of children is of some importance. It should be firm, somewhat elastic, and such as may be readily dried. A small tick, filled with straw or oat-chaff, will be suitable for young children; but the straw or chaff should be frequently changed. When the children are older, a hair mattress may be substituted. This should be exposed daily to a free current of air, and in summer it may be well to place it sometimes out of doors, in the sunshine for an hour or two. The luxury of a soft feather bed cannot be in any way recommended as suitable for children. Nor can we recommend night-caps. Care being taken that the head is not exposed to a draught of air, a child may safely and advantageously sleep without the incumbrance of a cap. The notion that sleeping without a night-cap is injurious to the hair, is quite erroneous. Excepting the cases of infants sleeping with their mothers and nurses, it is not advisable that young children should sleep with adults, and it is especially injurious when they sleep with elderly persons, as Dr. Roget has clearly proved that, in this case, heat is unduly abstracted from the infant body.

Bathing, etc. *Washing.* Too much attention can hardly

be paid to cleanliness during infancy and childhood. Careful washing should be performed daily, until the child is able to attend to its own comfort. In the early stage of infancy, warm water may be used with a fine sponge, and care should be taken not to allow exposure of the body so long as to produce fatigue or any severe impression of cold. We have known bad results to follow too protracted exposure in washing, and tardy movements in dressing the child. These are errors particularly likely to be committed by an inexperienced mother, for the first time taking charge of an infant.

As the child grows stronger, and when the weather is warm, we may gradually diminish the temperature of the water, until we may use it nearly or quite cold; but there should be no haste in employing very cold water. It will generally be well for the water which is to be used in the morning, to remain in the nursery during the night, in order that it may acquire the temperature of the air of the room. I strongly protest against the common error of bathing *infants* in cold water with a view to "hardening" them; they should have daily tepid ablutions only, unless in summer weather, when the water is comparatively warm.

Bathing. Perfect cleanliness cannot be secured without the frequent immersion of the body by bathing, and less than this will not suffice to keep the skin in a healthy and perspirable condition; indeed, without frequent bathing that healthy vigorous action of the vessels of the skin cannot be maintained, which is so conducive to health in the child as well as in the adult. The now frequent use of the bath in its various forms, is one of the few continental customs which we might adopt with advantage; but it is gratifying to observe, that public attention in this country is increasingly directed to this cleanly and wholesome habit.

As far as it relates to the management of infancy and childhood, I will give a few concise directions on the subject of bathing.

Baths are either *hot, warm, tepid,* or *cold.*

The temperature of the *hot* bath is above			98° Fahr.	
„	„	*warm*	from	85° to 98°
„	„	*tepid*	„	65° 85°
„	„	*cold*	„	32° 65°

The temperature of the morning and evening bath should be about 90° or 96° Fahr.; and on no account should the infant be submitted to *cold* bathing during the first few weeks of its existence.

"To use cold water," writes Dr. Conquest, "at this early

stage of being, is most hurtful, dangerous, and cruel; and no means will be found more efficacious in producing disease."*

I may here contradict the erroneous assertion, that the warm or tepid bath has a "weakening" effect on children. This is by no means true: rather by cleansing the pores of the skin, and thus assisting both perspiration and circulation, it is as beneficial to health as it is soothing and comfortable. I may add that, though mothers generally pay more attention to bathing children in the morning than at any other time, it is highly desirable that the child should be thoroughly cleansed from dirt and perspiration every evening before he is put to bed. The temperature of the bath may be *gradually* diminished, until, at the age of three or four months, and if the infant is healthy, the cold bath at 65° may be used every other morning instead of the tepid bath; but this must be discontinued if not followed by a glow of warmth.

During the use of the bath, particularly in cold weather, the air of the nursery should be comfortably warm, and the exposure of the naked body should not be unnecessarily protracted. Brisk but gentle friction of the body immediately on its removal from the water, and rapid dressing, will be the most likely means to secure the most beneficial effects of the bath. In this way most children may be gradually brought to the use of the *cold* bath every morning; but some will be found unable to bear it with impunity, however constantly it may have been employed, and it will be well for the mother to know when the use of the cold bath should be abandoned. If after the bath the child is chilly and languid, depressed in spirits, torpid and drowsy; if the countenance is pale, and the lips livid; and if the surface of the body continue cold, it is clear that the bath is injurious and should not be repeated. In cases where the cold bath cannot be borne, all the benefits of a general bath may frequently be obtained by means of a miniature shower bath. This may be done by dropping water on the head and shoulders, by means of a tin vessel perforated with holes, and held over it; a very convenient vessel may now be purchased for this purpose, the flow of water being regulated by the pressure of the thumb upon an opening in the handle.

Moderate exercise is advantageous before bathing; if the child is too young, friction of the body may be substituted.

The best period of *sea bathing* will be about two hours after breakfast: but the child must not be previously exhausted by over fatigue, nor should it afterwards be too

* Letters to a Mother. By J. T. Conquest, M.D.

much exposed to the cold currents of air on the sea shore.

Whatever form of bathing be adopted, all violent plungings should be avoided, as likely to excite the alarm of children, and to do more harm than good. The use of the bath should studiously be made as agreeable as possible, when it will soon be really enjoyed and anticipated; but much here will obviously depend upon the judgment of the nurse.

LIGHT. If I were less confined to remarks immediately practical, I might raise here many very interesting questions respecting the influence of light upon health. Whatever may be its mode of action, the fact that it does act in a very important degree upon the animal economy is undoubted, though its influence is far less considered than that of air. When we observe the blanched countenances of children (especially such as reside in close murky lanes) in large towns, we are doubtless correct in ascribing such unyouthful symptoms in youth, partly to the want of fresh air and exercise: but we judge the case imperfectly if we do not take into consideration another serious want—*the want of a fair supply of natural light.*

If we require familiar instances of its influence, we have only to glance at some common facts in the vegetable world. Observe the effect which the gardener produces on the stem of the celery plant, simply by keeping it without light. If allowed to grow naturally, exposed to light, it would be strong, fibrous, and darkly coloured; excluded from the light, it is as we see it on our tables, blanched and tender. I might also refer to the delicacy of structure, and the pallid hue which mark the species of fungi vegetating in the dark cellars.

Some time ago, a number of poor people went to reside in certain dark cells under the fortifications of Lisle, where they produced such a number of deformed infants, that it was deemed necessary to order the cells to be shut up, and not to be used as the habitations of human beings.

The practical lessons to be deduced from these facts are sufficiently obvious. They teach us freely to expose the infant to the light, as soon as the eyes have overcome their first extreme sensibility; I speak of the diffused light of day, not of strong artificial light, for the latter is injurious. They teach us not to darken the nursery during the day, not to close the shutters during the night, on no account to use window curtains in the nursery, and, as often as is practicable, to remove the child from the murky atmosphere of the city, to the purer air and light of the suburbs. A full supply of light is essential in the *school-room.*

SANITARY AND SOCIAL SCIENCE.

REPORTS ON CITIES, TOWNS, & DISTRICTS.

THE SANITARY CONDITION OF HUDDERSFIELD.

By SAMUEL KNAGGS, Esq.

(*Concluded from* p. 79.)

GROSS MORTALITY. The total mortality in Huddersfield, during the five years ending December 1855, was 4,052: the greatest mortality occurred in 1853, when the deaths amounted to 870; the lowest in 1855, when they numbered only 713; the average mortality of the five years being 810, or, one in every thirty-eight of the population. The average mortality throughout England of the fourteen years, 1838-51, is at the rate of 2·234 per cent., or, 672 equivalent deaths for the number of the population of Huddersfield; being in the proportion of 1 to 46. From this it is evident that 138 lives are annually lost in Huddersfield above the average mortality of England. Looking at the density of population in England, we find that each individual bears relation to two acres of surface; whereas, in Huddersfield, there are eight persons to each acre. This consideration, however, is not sufficient to explain the reason of this high rate of mortality; because we see from the returns of the Registrar General, that there are many towns in which the density of population is as great as Huddersfield, but where the gross rate of mortality is considerably less. Thus Cheltenham, with nine persons to each acre, loses only one in every 50; and Southampton, with thirteen to the acre, one in 41. The mortality of Huddersfield is identical with that of Birmingham and Shoreditch; yet the former numbers 65, and the latter 161 persons, to each acre; and in the city of London, with 129 to the acre, the deaths are one in 39, or eighteen deaths fewer than Huddersfield. The mortality in Huddersfield contrasts favourably with that of many of our manufacturing districts; thus, in the districts of Leeds and Liverpool, the deaths are one in 30, the former numbering forty-eight persons to the acre, the latter 116; whilst in the Manchester district, which has eighteen to the acre, the deaths are one in 29, which gives a mortality of 252 in excess of Huddersfield.

But if we contrast the mortality of Huddersfield with that of a tolerably healthy agricultural district, we shall have little cause for congratulation, but much for serious reflection, upon the sources which originate such wholesale sacrifice of human life.

In Huntingdon, for example, the deaths are as one to 59 of

the living; and in Cranbrook in Kent, one in 61: which would give 304 deaths less than Huddersfield, with an equivalent population.

MORTALITY OF CHILDREN. In analysing the mortality tables, we are struck with the large proportion of deaths occurring in early life. Taking the mean of the three years 1853-54-55, 353 children die annually in Huddersfield, under the age of five years. An average of the births in 1851 and 1852, gives a mean of 1,216; so that we may estimate, that out of every seven children born in Huddersfield, two die ere the close of the year. The mortality throughout England, at the same period of life, is as 2 to 8, and in healthy country districts, as about 2 to 10: thus we are enabled to detect one source of the high rate of mortality, inasmuch as we find that Huddersfield, proportionally to its births, numbers 49 deaths in excess of the average of England, and 110 in excess of healthy country districts. In some manufacturing districts the infantile mortality is still higher: one half of all the children in Manchester die before they attain the age of five years.

MORTALITY OF ADULTS. In comparing the mortality of more advanced life in Huddersfield with that of England, we find between the ages of five years and twenty-five, a slight excess on the side of Huddersfield; 118 being the mean annual loss of this town. A still greater mortality is shown between the ages of twenty-five and forty-five: it being at the rate of 12 per cent. throughout England, but ranging as high as 14 per cent. in Huddersfield. After forty-five years, the excess of deaths is on the side of England; for at all subsequent ages we find them in the proportion of 33 per cent. of the gross mortality, whereas in Huddersfield they number only 25 per cent.

MORTALITY OF SEXES. In the three years, 1,246 males, and 1,121 females, died in Huddersfield. In relation to sex, we see that the greatest number are males, but contrasted with the experience of England, the excess of deaths in females is on the part of Huddersfield.

ANALYSIS OF THE CLASSES OF DISEASE. In examining the comparative fatality of the several classes of disease, we remark at once the great mortality from tubercular disease, which in the three years, 1853-54-55, gives an annual mean of 167 deaths, or 23 per cent. of the deaths from all causes. In England it rates at 14, and in the West Riding at 16 per cent., on an average of four years: so that from this class of disease alone, we have a yearly loss of 72 deaths above England's average. The diseases of this group are consumption, mesenteric disease, and scrofula. From consumption alone, 246 persons died in the

two years 54-55, of whom 122 were males, and 124 females: of this number, 101 died under the age of twenty-five years, and 195 under forty-five, so that nearly four-fifths of the deaths from this cause were in comparatively early life. Eighty-two deaths occurred in workers in cotton, silk, and woollen, 42 in labourers, and others engaged in out-door employments, 60 in wives and children of labourers and mechanics, and 62 in all other classes. There is no doubt that many of those here classed as the wives and children of mechanics, for want of more correct data, should appear as workers in cotton, woollen, or silk; but I think that in the last group there is sufficient to justify the inference that the high rate of mortality from this disease does not depend upon causes inherent to the locality itself: the group (62) is formed by small shop-keepers principally, and very few of the upper classes are included. It would have been interesting to know the relative mortality from this disease amongst the workers in cotton, woollen, and silk, and to have compared it with the numbers employed in each department; but the occupations are too loosely returned to obtain anything like a trustworthy approximation to the truth. From diseases of the respiratory organs (excluding consumption), Huddersfield loses 101 annually, or 12½ per cent., which is exactly the same as that maintained by an average of England: this, I think, still further supports the view, that the excess from consumption is from other cause than locality. The deaths from zymotic diseases in Huddersfield, during the three years, 1853-54-55, give an annual mean of 172, bearing a relation of 22 per cent. to all deaths: contrasted with the experience of England, during the four years, 1849-52, we find an average of 97,904 deaths, or 25 per cent. From this it would appear that the balance of this important class of disease is in favour of our town, but it must be borne in mind that the comparison is not instituted between the same years, that the years 1854-55 were unusually healthy years throughout the country generally, whereas the four years of England's experience show a heavy mortality, and of course indicate a high rate of zymotic disease. It would, I think, be found, if practicable to institute an exact comparison at a period when zymotic diseases were rife throughout the country, that the experience of Huddersfield would show itself above, rather than below, the average ratio.

Thus the mortality from fevers during these three healthy years, averaged as high as 5¾ per cent., whilst that of England in the four unhealthy years, was only 4½ per cent. The diseases of the zymotic group are in some years virulently

epidemic, and when cholera, influenza, fevers, and infantile diseases of this class are so, the rate of mortality rises to an extreme degree, and there is little doubt that the influences which are capable of generating fevers to excess in healthy years, would be quite adequate to raise the rate of mortality in every direction, given a sufficient quantity of the specific virus to set the wheel in motion. Diseases of the nervous system show a relative mortality of 13 per cent. in England, whereas in the three years, '53-55, in Huddersfield, they mount to 18 per cent. Of this group, 85 deaths occur in the year from convulsions, the greater part of which takes place in childhood. Diseases of the urinary organs are more frequent here, bearing the proportion of 1 to 73, whilst in England there is one death from this cause in every 115. Deaths from violence and external causes are also slightly above the average. One mother dies in child-birth to 173 children born alive in Huddersfield; whereas in England, the proportion is as 1 to 192. In this examination of the proximate causes of death, we must not forget what has before been alluded to, that the advantage has always been on the side of Huddersfield, from the necessity which has existed for contrasting the results of an unusually healthy time, with the last report of the Registrar General, which only gives information up to 1852. If, therefore, in this comparison, the rate of special mortality is in excess, we must allow for a still greater augmentation, when the conditions for analysis are more equitably adjusted.

CAUSES PRODUCING DISEASE. Three hundred and fifty children die every year in this town; many of them from inherited weakness, many from zymotic diseases, but by far the greatest proportion from preventible disease, engendered by improper food and general mismanagement. The period of infancy ought not to be fraught with such extreme peril to the healthy babe; it is exempt from many of those causes which sow the seeds of mortality in the adult, and when children, originally robust, are nurtured sensibly and well, the mortality, except from epidemic disease, is very trifling. It has often fallen to my lot to see fine healthy children at birth swept off in a few days, and sometimes even hours, by convulsions, brought on by the mistaken, but intended, kindness of over-feeding. No sooner is the little creature born, than its solicitous friends, brimful of medical superstitions, and anxiety to do their part in the business, begin to cram it with butter and sugar, bread sops, or gruel, or some similar abomination. Naturally enough, this begets the stomach-ache, to relieve which, each adviser has some favourite panacea, generally a

form of opiate—a Dalby, or a Godfrey. If the child is fortunate it gets (as sometimes happens) an overdose, which at once relieves it of its troubles, and the world of its screams; otherwise present relief is purchased by another bill upon the stomach, which soon requires speedy payment: in this way it becomes more and more deranged, the nervous system is involved, and a desperate struggle ensues between the vigorous efforts of nature to repair, and these unintentional, but well directed, powers of art to destroy. With astonishing tenacity of life, some infants fight their way through fields more fatal than those of Marathon, much enfeebled by the severe discipline to which they have been subjected, but every succeeding month, instead of strength brings weakness; experience of the child's sufferings has not awakened the mind to a knowledge of the source from whence they spring—improper feeding began the mischief, the same thing keeps it up, and if life is not, as it were, thrown up in disgust, by some violent convulsion, the child dwindles almost to a skeleton, and sinks from tubercular disease or inanition. This is no highly coloured picture; I am satisfied that more than half of the children that die in Huddersfield, and throughout the country, would live to become men and women, if the nurseries of our country were better managed, and children were treated in accordance with the dictates of reason and common sense. But we have seen that the mortality in Huddersfield in children is above the average, which induces further examination. We consider that some excess may be accounted for by the very imperfect medical attendance which the sick receive. Nearly 100 deaths, registered every year, are uncertified in this town, more than two-thirds of which are children: by uncertified we understand, that these children were either entirely destitute of medical attendance, or else, dependant upon that furnished by unqualified practitioners. To this number we must add those numerous instances of cases certified in which the medical man's aid is sought at the last moment, when life has been almost frittered away by neglect or malpractice, and we shall have some conception of one of the causes which raise the rate of infantile mortality.

Births out of Wedlock. The proportion of births out of wedlock is large; thus 4 to the 100 is that registered in London in 1851, whilst in Huddersfield it is as high as 5 per cent; about 7 per cent. being the average of the whole kingdom. This may have some bearing upon the infantile mortality. Another circumstance, which doubtless has much to do with it, is the pernicious practice, largely in vogue in our

manufacturing districts, of mothers leaving their young children, either to the care of some neighbour, or sister, perhaps, but a few years older than the child to be looked after, during the day, whilst the mother pursues her accustomed mill occupation. This is evidently an infraction of those domestic duties, which ought to be paramount in the parent's mind, and which, in a great majority of instances, will assuredly entail its own punishment, in the declining strength and premature death of their neglected offspring.

CAUSES OF ADULT MORTALITY. The influences which operate largely in raising the mortality of our adult population, above the limits of the mortality natural to the country, may be classed under three heads, viz., the general, the social, and those dependent upon occupation. The general influences include atmospheric impurity, unwholesome and adulterated food, badly drained, ill ventilated, and ill lighted dwelling houses. Amongst the social influences, we may notice intemperance, sedentary habits, intermarriage between blood relations, and persons of the scrofulous diathesis; whilst, as resulting from occupation, we have overwork, injurious to all, but destructive to children; employments entailing constrained and unnatural postures, as with tailors and shoemakers; overheated rooms; or atmospheres impregnated with particles of dust, metal, stone, or other gritty impurity.

The atmosphere, though invisible, is essential to life; its principal use is to supply us with a medium for breathing; any gaseous, liquid, or solid particle contained in it, foreign to its natural composition, acts either mechanically upon the air cells of the lungs, with which it comes in contact, or else is absorbed into the blood, and thus distributed over the whole body: in the first case, it irritates and inflames the surface—in the second, it vitiates and poisons the system. The sensible causes, which contaminate the atmosphere of Huddersfield, are evident to the most superficial observer: the air in its purity should be evident neither to the senses of sight nor smell, but here it is otherwise. Around us are long chimneys, continually vomiting forth dense masses of black smoke, which gradually mingle with the pure fluid with which God, in compassion to our necessities, has furnished us, and thus we provide a continual irritant for our respiratory organs, an artificial ebon covering for vegetation, and the sure means for a speedy and effectual disfigurement of one of the most beautiful towns in the West Riding of Yorkshire.

THE TOWN DRAINAGE. With respect to the drainage of Huddersfield we speak guardedly, as we have not yet had the op-

portunity of examining into its details. It appears that all the drainage of the town is discharged by several outlets into the river; one by King's Mill, another near the Shorefoot, and a third near the gas works: now by this means the river is poisoned and rendered impure, before its waters have passed by the town, which might easily have been prevented, by causing all the sewerage to open into the river *below* the town. The Colne is not a tidal river, and therefore if all the sewerage of the town was conveyed along a main sewer to some distance below the town, and there merged into the stream, we should have comparatively pure water, and less injurious exhalations from it. The Colne rises from the heights of Saddleworth and Holmfirth, and brings to us, no doubt, some considerable dye, and other impurity, collected in its course; but that does not excuse our pouring in the excreta of 30,000 persons immediately under our very noses. The perfection of drainage would be, to divert all the sewerage, dyes, and excrement, into a separate channel; to deodorise, precipitate, and dispose of the solid material for the fertilisation of the earth; and to allow the supernatant purified water to empty itself into the river *below* the town. This appears to be done effectively, and without any offence or detriment to the community, at Glasgow; and surely, if this be so, the example is worthy of universal adoption.

In this town, cesspools, or ash pits, connected with privies, are very numerous. These ought never to be permitted in towns, or where any large number of houses are collected together in a small space: their existence is only necessary when the system of drainage is imperfect or incomplete. When there is drainage near a house, a three-inch pot pipe should be laid from the privy to that drain, and the privy itself should be provided with a "Sanitary Pan Closet," consisting of a simple pan and syphon trap, made of glazed earthenware, and which should be attached to the drain. If it is not practicable to lay on water with a cock to such a pan, it must be kept clean by throwing down all the slops and waste water, or at least a pail of water every day. The occasional practice of carrying drains beneath the cellar of a kitchen of a house is very mischievous, and most provocative of fevers; all drains should be carried round the outside of houses, and in rows of houses, the drains should run into a common drain under the backyard, which should run into the street drain at the end of the row. Surface drains should never be permitted to carry off any water from sinks or waterclosets, which should always go to the underground drain; and all gratings leading to drains should be trapped.

HOUSE VENTILATION. The general plan of house building is good, and the houses of many of our artisans are fitted up admirably; but a little more attention to ventilation, generally, and the lighting of our cellar kitchens, would be beneficial. Many of these cellar kitchens are abodes which the artisan should shun; if the drainage is not exceedingly good, it is in them that the poison is most potent, because least diluted: in them we see our typhus and scarlet fever cases in the severest forms and largest proportion; into many of them the sun-light can but feebly enter, and light is as essential to robust health, as the air we breathe and the food we live on. A great defect in the cellar kitchens of Huddersfield, is not having a sufficiently large area in front of the windows. In London the area is generally about two yards wide, extending along the whole frontage of the house, so as to give a good supply of air and light; the bottom of the area being below the level of the basement floor. But in Huddersfield, a small area, about half a yard wide, and of the length of the window, is placed outside each window, with a grating at top, so that air and light are both obstructed, and the bottoms of these areas are about on a level with the sill of the window. The products of the combustion, both of respiration and of gas light, are poisonous, and therefore unfitted for inhalation. By such simple means, as the fireplace open to the ceiling, Arnott's valve, the syphon tube, or the diaphragm chimney, it is practicable to provide effectually against this source of contamination of the air we breathe; and yet how rarely is it that we find more provision made for the entrance of pure air, and the exit of foul, than is to be found in the bore of the key-hole, the chink of a window sash, or the accident of a fire place.

ATMOSPHERIC SELF-PURIFICATION. There is one point in connection with the purification of the atmosphere, which ought not to be overlooked. The poison of animals is the food of plants—what plants exhale (oxygen) is the respiratory food of man. If, therefore, in our crowded towns we cannot give to each little family a separate garden plot, at least, let us make use of all our open available spaces,—planting them with trees and hardy shrubs, so that, by means of these atmospheric scavengers, the air may be preserved in its purity.

INTEMPERANCE. Habits of intemperance are largely prevalent amongst us; and it is to these that we owe our excessive mortality from renal, liver, brain, and perhaps, tubercular diseases. The causes promoting these habits, and through them such wide spread misery, are very numerous. Amongst the most influential, we recognize the great multiplication of

beer houses, which cannot be supported by the *legitimate* sale of beer; the meetings of clubs, and friendly societies, and payment of monies in such places; unhappy and badly regulated homes, which drive the man from the fireside circle, to take refuge in the tavern; these are too prevalent in our manufacturing neighbourhoods, and are in great degree traceable to the employment of our young females in factories, which seems a bad preparation for the quiet routine of domestic life: and lastly, the want of provident habits, which the vicissitudes of trade and health require, and the absence of taste for those places which offer innocent and healthful recreation both for mind and body.

So long as intoxicating liquors are procurable, we must expect to have some degree of drunkenness; but if we can divert some of the great influences the vice will considerably diminish, and the disease resulting therefrom. To this end let us encourage those well formed provident societies, which protect the working man against the misfortunes of scanty work and bad health, keep him free from debt and care, and which do not expose him to temptation, by holding meetings at beer houses: let us educate his mind and instincts when young to higher aspirations and nobler tastes, by our day and Sunday schools, mechanics' institutions, concerts, lectures, and free libraries: let us give him bathing places, gymnasia, and parks for his health, happy and healthful homes for his family, and we strike directly at the root of the most fearful social evil, which decimates the lives, while it desolates the happiness of thousands upon thousands of our countrymen.

OVERWORK. The evils resulting from overwork are to be found in all classes of society: to maintain the body in health, properly apportioned exercise, recreation, and rest of its corporeal and mental functions, are essential. If we neglect these conditions, so necessary to its well being, we introduce an element of decay; and it matters little whether it proceed from the apathy and inactivity of indolence, in its mental or physical agency, or from the opposite extreme of over-excitement and over-taxed activity.

In our crowded seats of manufacture, however, the danger is not so much from the too little, as from the excessive, strain to which both mind and body are subjected: here every faculty is, as it were, lashed into violent exertion, to outstrip in the race of competition. To the necessity for restraining this overwork, which consigned so many, especially amongst young people, to an early grave, we must attribute the interference of the legislature, in the shape of "the Ten Hours Bill." The great points introduced into the factory practice by this mea-

sure are, that no children are admitted to factory work under eight years of age; children between the ages of eight and thirteen work from six to seven hours a day, and are besides compelled to have three hours schooling; or they may work ten hours on alternate days, by giving notice to the inspector of the district, in which case they are required to have five hours schooling on the previous day. Females of all ages, from thirteen upwards, and males between the ages of thirteen and eighteen, are called young persons, and work ten and a half-hours a day, for five days, and seven and a half on the Saturday. Males over the age of eighteen are not restricted as to time, and frequently subject themselves to overtime. In an able pamphlet, by Mr. Baker of Leeds, on the "Factory Acts," he tells us that the "duration of life amongst the factory-workers is very nearly the lowest amongst English work-people;" and if this be so, it is clear that much yet remains to be done for the physical protection of our factory workers.

Perhaps of all compelled causes, too prolonged work, either of mind or body, is the most productive of disease; it sows the seeds of decay alike in the peer of the realm, as in the needlewomen, and workers in our factories. For those individuals, who voluntarily impose upon themselves more labour than their strength enables them to support, we can here afford but little sympathy; but we think it is eminently due in those cases, where thousands of our humbler brethren are compelled to earn their daily bread under a fixed system, which necessitates a wear and tear of mind and body, to which no human beings can be subjected without receiving permanent and certain injury. During my few years residence in this town, some improvement has resulted from the operations of a society having a branch here, and called the "Early Closing Association," established for the purpose of shortening the hours of labour throughout the land, by the agency of combined agitation, and the influence of well directed and enlightened public opinion.

Slight reflection assures us how great masses of disease originate directly from ignorance of the most simple and elementary physiological laws of nature; truths which ought to be indelibly impressed upon the mind of every child, but which, in this age of progress, are not thought of sufficient importance to enter into the plan of general education. The result is that even amongst our great ones, upon whose attainments and judgment in other matters we rely with reverence and pride, we find too often, in matters connected with hygiene and medicine, the most lamentable inconsistencies in conduct, and

the most degrading superstitions in doctrine. All classes of society suffer from this incomprehensible and serious neglect, of that which should constitute one of the first and leading features of healthy practical education; but in an especial degree is this so with the poorer classes. A vast proportion of the diseases which beset humanity, would, I am convinced, be effectually put a stop to, if the principles upon which our health depends were well engrafted in the minds of society. I do not think it exaggeration to say, that hundreds of lives are yearly lost in this town, from want of a proper knowledge of the functions and requirements of the human body.

We have at the present time no national plan of education; therefore it is evident that any steps to remedy this deficiency must be from voluntary effort. Something might be done to encourage a taste for this science, by lectures and popular works on the subject. In the hands of the more advanced student, such text-books as those of Carpenter, Lardner, and others, would furnish ample materials of interest and instruction; but amongst the poorer classes I would suggest the circulation of popular and sound physiological tracts, written with reference to the great questions of child management; laws affecting digestion, respiration, and the nervous system; drainage, ventilation, and others of the same class, as the means best calculated to convey sanitary instruction to the homes of our humbler neighbours.

The Society of Arts, in the examinations, which it has lately instituted, of candidates from mechanics' institutions, has selected physiology as one of the subjects on which it examines: this is, indeed, a step in the right direction, and I trust it will not be long before physiology will assume the position it ought to occupy, from its importance, in every public and private school throughout the land.

But there are some causes which prejudice the comfort and well being of whole neighbourhoods of individuals, not kept up from want of knowledge that the consequences are disagreeable and injurious to others, nor because the nuisances cannot effectually be checked, but simply because the expense of doing away with the nuisance, is more than the individual creating it is willing or able to encounter.

Now this is evidently a state of things requiring the interference of Government, to compel uniformity of practice throughout the country. It is manifestly unjust that thousands of human beings should be forced to breathe an atmosphere, loaded with unburnt charcoal, or poisoned by the fumes of rivers, rendered pestiferous by the refuse thrown into them, for the convenience of a few privileged individuals: whilst at

the same time it is also unfair to expect that steps should be taken in one neighbourhood *alone* to remedy such evils, because the manufacturers would be subjected to a considerable outlay; and if the requirements throughout the country were not alike, those laid under such restrictions, would be placed at a disadvantage in the necessary competition of prices. By the appliance of well tested machinery, it is without doubt that the smoke nuisance can be entirely abated; and experiment has also shown, that is quite practicable to filter the refuse of our dye-houses, and to substitute for it a clear and harmless water, which would admit of being discharged into the river without detriment. Surely, then, it would be within the legitimate influence of Parliament to put its veto upon such causes of atmospheric and river impurity; and if the edict of compulsion is general, the effect upon trade cannot be injurious, whilst to the public welfare it must be greatly beneficial.

ADULTERATION. Another very widely spread evil, which seems to call imperatively for some legislative interference, is the adulteration of our food. This is a great crime, and unfortunately, as unimpeachable evidence has proved, one of very common occurrence. It falls with greater severity upon the poorer classes, and is, undoubtedly, in many of its forms very detrimental to the public health. Perhaps the recommendation to appoint experienced public analysts, to subdistricts throughout the country, to whom suspicious articles of food or medicine might be referred for examination, with the punishment of publicity being given to the names of parties vending the adulterated articles, would be a measure as efficient and satisfactory as could be devised for this grievance.

The proportionate mortality accruing from special occupations, requires more consideration and facilities for investigation than could be compassed in the present sketch; and, indeed, the statistical standards for comparison are not arranged with sufficient exactness in the last census report, to allow any safe practical deduction as to the comparative healthiness of the different departments of our local manufacture. From Thackrah's previous observations, we should infer that the employments in the woollen trade are by no means unhealthful: but overwork, employment in overheated and badly ventilated rooms, and dusty and gritty atmospheres, will add very materially to the rate of mortality.

The continuance of all these causes which influence largely our annual mortality, and yet are easily remediable, is a strong argument in favour of the general appointment of health officers. In London and the surrounding districts, competent

persons in each district are appointed, to investigate continually the causes which engender local disease, and to suggest such remedial measures as are likely to check it. The population of our parish is far greater than most of those districts to which officers have been appointed, and, therefore, if human life is as valuable in Huddersfield as in London, their efforts are certainly as much required.

Huddersfield, as we have seen, though very superior to many manufacturing towns, is yet considerably above the mortality of healthy towns; its deaths from fever cases in a healthy year, are beyond the average proportion throughout England in unhealthy years. It is, of course, impossible to tell the number of cases of fevers, and other zymotic diseases, which actually occur, from the number of deaths registered; but we must suppose, from the fact stated, that the existence of a vast amount of preventible disease is manifest. Now an officer of health would be acquainted day by day, and week by week, with the then prevailing type of disease, from the weekly registers of deaths, and from the information he would be enabled to organize from the parochial medical officers, and others of his professional brethren. The reason of the preponderance of disease in certain localities would soon be made apparent, and the arrest of a pestilence at the outset, would be the saving of many scores of lives. The duty of a medical officer of health would be to exercise a general supervision over all influences, measures or proceedings, involving the public health, and to furnish periodical reports to the governing bodies of his district. Such a person would have every inducement to bring to light all influences injurious to health and susceptible of improvement; and besides being qualified by previous training for the task of investigation, he would feel, from a sense of duty, directly interested in their exposure.

Under our present system it is the business of no one to make these inquiries. Should a looker-on have the temerity to assert that the rate of mortality is too high to show a healthy town, and to hint at the existence of imperfections to our governing bodies, his statements are, in nine cases out of ten unless emanating from influential sources, received with ridicule, or treated with contempt.

To the preconceived notions of those, whose minds are constantly engaged upon the improvement and progress of the town, it must be in all its details a model town. Huddersfield ought to be, and I think might be made, a model town, for it has very great natural advantages; but it will not deserve the name of "model", so long as it continues to lose, annually, one in every thirty-eight of its inha-

bitants. A constant and independent monitor is wanted to bring this important question prominently forward, and to display it in all its aspects, and till this is done no radical improvement is probable. On this question, peculiarly its own, the medical profession now finds, without doubt, all its pecuniary interest arrayed against sanitary reform.

MISCELLANEA.

GAS NUISANCES AND THEIR REMOVAL.

In a report on nuisances arising from gas-works, the Trades Committee of the Medical Officers of Health give several valuable remedial suggestions, herewith condensed.

Various sources of annoyance to a neighbourhood may arise from the manufacture of gas. 1. *Smoke.* The amount of smoke from the furnaces is usually insignificant, but that which proceeds from the openings at the roof of the retort-house is a nuisance, and is at its height when the retorts are being charged, or the coke withdrawn. The evolution of smoke is less during the charging of the single than of the continuous retorts. The former are charged in a few seconds, before the coals are sufficiently heated to part with much volatile matter. With the continuous retorts, there is a delay from the double charging at each end. Much of this might be avoided if two scoops at each end were used, both being ready filled before charging, the mouth-pieces being immediately and simultaneously adapted. The coke should be removed quickly, and at once quenched with water. Under the best arrangements a great deal of smoke is given off, which, with the steam, should be prevented becoming a nuisance. A remedy might be found in the closure of the roof openings, and in forming communications, at the upper part of the retort-house, with the chimney which carries off the heated air and smoke from the furnaces. 2. *The use of refuse lime from the purifiers* for luting the mouth-pieces is a source of nuisance, as it contains sulphur and other noxious compounds, and gives off, when heated, disagreeable vapours. This practice should be discontinued, and fresh lime, coke ash luting, or some other unobjectionable material, should be employed. 3. *Ammoniacal liquor and tar*, where the pits are uncovered, gives an offensive odour. The remedy is to cover the pits, and to convey these products without exposure to the barges. 4. *Revivification of the oxide of iron* causes an evolution of ammonia, favoured by a rise in temperature which the oxide undergoes during the process. This nuisance is less where effectual means of removing am-

monia are employed prior to the passage of the gas to the oxide purifiers. Precautionary measures consist in the revivification of the oxide at short intervals, in the interception of the vapour that is given off, as at Equitable Works (Pimlico), and at the Chartered (Horseferry Road), and partly in the careful removal of ammonia from the gas by sulphate of lime, muriate of manganese, etc., prior to its being submitted to the action of the oxide of iron. Mr. Evans, of the Chartered Gasworks, however, thinks that ammonia, in moderate quantity in gas, is of advantage in neutralising the sulphurous acid formed during the combustion of the bisulphuret of carbon which gas always contains; and the presence of ammonia in gas is held, by some gas-engineers, to prevent the deposit of naphthaline in the small supply pipes. 5. *Refuse of the wet lime purifiers.* When the cream of lime from the purifiers is stored in pits, or in open tanks, the effluvia are most offensive. The carbonic acid of the atmosphere, also, acting upon the matter, increases the evolution of sulphuretted hydrogen and ammonia. A partial remedy for this nuisance is the use of water-tight covered tanks. 6. *Refuse from the dry lime purifiers.* The effluvia from a dry lime purifier, when opened, where no means of separating ammonia, sulphuretted hydrogen, etc., are previously employed, are overpoweringly offensive. Opening and emptying the purifier thus contaminates the atmosphere to a great distance. The dry lime purification should never be allowed unless effectual means of previously removing these compounds exist. When charged with offensive products it should be conveyed from the works in covered receptacles. 7. *The employment of the crude gas-tar for coating the gas-holders and iron work* is, in some instances, a source of offensive odour. An attempt should be made to discover some preservative which shall not possess similar disadvantages.

TREATMENT OF PERSONS APPARENTLY DROWNED.

THE Secretary of the Royal National Life Boat Association requests us to publish a series of rules, for the treatment of persons apparently drowned. We give with pleasure the really useful points.

ROYAL HUMANE SOCIETY'S INSTRUCTIONS. Send quickly for medical assistance. *Cautions.*—1. Lose no time; 2. Avoid all rough usage; 3. Never hold up the body by the feet; 4. Nor roll the body on casks; 5. Nor rub the body with salt or spirits; 6. Nor inject tobacco-smoke or infusion of tobacco. I. Convey the body carefully, on its face, with the head and shoulders supported in a raised position, to the nearest house. II. Strip the body and rub it dry; then wrap it in hot blan-

kets and place it in a warm bed in a warm chamber, free from smoke. III. Wipe and cleanse the mouth and nostrils. IV. In order to restore the natural heat of the body, move a heated covered warming-pan over the back and spine; put bladders or bottles of hot-water, or heated bricks, to the pit of the stomach, the arm-pits, between the thighs, and to the soles of the feet; foment the body with hot flannels; and rub the body briskly with the hand; do not, however, suspend the use of the other means at the same time; but, if possible, immerse the body in a warm bath at blood heat. V. Volatile salts are to be passed occasionally to and fro under the nostrils. VI. No more persons are to be admitted into the room than are absolutely necessary. If apparently dead from intense cold, rub the body with snow, ice, or cold water; restore warmth by slow degrees; it is highly dangerous to apply heat too early.—*General Observations.* On the restoration of life, give small quantities of wine, or diluted brandy, warm, keeping the patient quiet in bed. The treatment is to be persevered in for three or four hours. It is absurd to suppose that a body must not be meddled with or removed without the permission of a coroner.

DR. MARSHALL HALL'S INSTRUCTIONS. Treat the patient instantly, on the spot, in the open air, expose the face and chest to the breeze (except in severe weather). I. *To clear the throat,* place the patient gently on the face, with one wrist under the forehead. If there be breathing, wait; if not, or if it fail, II. *To excite respiration,* turn the patient well and instantly on his side, and excite the nostrils with snuff, or the throat with a feather, etc., and dash cold water on the face previously rubbed warm. If there be no success, lose not a moment, but instantly, III. *To imitate respiration,* replace the patient on his face, raising and supporting the chest well on a folded coat or other article of dress; turn the body very gently on the side and a little beyond, and then briskly on the face, alternately; repeating these measures deliberately, efficiently, and perseveringly, fifteen times in the minute, occasionally varying the side; when the patient reposes on the chest, this cavity is compressed by the weight of the body, and expiration takes place; when he is turned on the side, this pressure is removed, and inspiration occurs. When the prone position is resumed, make equable but efficient pressure, with brisk movement, along the back of the chest; removing it immediately before rotation on the side. IV. *To induce circulation and warmth* rub the limbs upwards, with firm grasping pressure and with energy: by this measure the blood is propelled along the veins towards the heart. Avoid the continuous warm-bath, and the position on, or inclined to, the back.

PROGRESS OF EPIDEMICS.

LOCAL REPORTS OF EPIDEMIC AND ENDEMIC DISEASES

During the Months of March, April, and May, 1857.

Place.	County.	Lat.	Long.	Observer.
St.Mary, Scilly	Cornwall -	49.50 N.	6.24 W.	J. G. Moyle, Esq.
Teignmouth -	Devonshire -	50.32 N.	3.29 W.	W. C. Lake, Esq.
Odiham - -	Hampshire -	51. 8 N.	1. 3 W.	J. McIntyre, M.D.
Canterbury -	Kent - -	51.17 N.	1. 4 E.	G. Rigden, Esq. W. Haffenden, Esq.
Chatham -	Kent - -	51.21 N.	0.14 E.	F. J. Brown, M.D.
Wandsworth -	Surrey - -	51.28 N.	0. 7 W.	G. E. Nicholas, Esq.
Putney - -	Surrey - -	51.28 N.	0. 8 W.	R. H. Whiteman, Esq.
Up. Holloway	Middlesex -	51.32 N.	0.03 E.	W. B. Kesteven, Esq.
Swansea -	Glamorgansh.	51.38 N.	3.50 W.	W. H. Michael, Esq.
Aspley Guise -	Bedfordshire -	52. 1 N.	0.37 W.	J. Williams, M.D.
Saffron Walden	Essex - -	52. 3 N.	0.12 E.	T. Spurgin, Esq. H. Stear, Esq.
Bedford - -	Bedfordshire -	52. 8 N.	0.51 W.	T. H. Barker, M.D.
Newpt.Pagnell	Buckinghams.	52.10 N.	0.42 W.	G. O. Rogers, Esq.
Sharnbrook -	Bedfordshire -	52.12 N.	0.40 W.	R. S. Stedman, Esq.
Wellingbro' -	Northamptons.	52.20 N.	0.40 W.	B. Dulley, Esq.
Beccles - -	Suffolk - -	52.25 N.	1.48 E.	W. E. Crowfoot, Esq.
Thetford -	Norfolk - -	52.26 N.	0.45 E.	H. W. Bailey, Esq.
Stourbridge -	Worcestersh. -	52.28 N.	2.32 W.	A. Freer, Esq.
Dudley - -	Staffordshire -	52.30 N.	2.10 W.	J. H. Houghton, Esq.
Barrowden -	Rutland -	52.34 N.	0.38 W.	H. J. Swann, Esq.
Wisbeach -	Cambridgesh.	52.39 N.	0. 5 E.	W. H. Hole, Esq.
East Dereham	Norfolk - -	52.40 N.	0.57 E.	J. Vincent, M.D.
Pontesbury -	Shropshire -	52.43 N.	2.50 W.	Wm. Eddowes, Esq.
Nottingham -	Nottinghamsh.	52.50 N.	1.10 W.	T. Robertson, M.D.
Burton-on-Trt.	Staffordshire -	52.53 N.	1.53 W.	S. Thomson, M.D.
Oswestry -	Shropshire -	52.53 N.	2.59 W.	P. Cartwright, Esq.
Wrexham -	Denbighshire -	53. 2 N.	3. 1 W.	E. Williams, M.D.
Hawarden -	Flintshire -	53.11 N.	3. 2 W.	T. Moffat, M.D.
Lincoln -	Lincolnshire -	53.12 N.	0. 5 W.	S. Lowe, Esq.
Alford - -	Lincolnshire -	53.15 N.	0. 6 E.	R. U. West, M.D.
Gainsborough	Lincolnshire -	53.23 N.	0.47 W.	D. Mackinder, M.D.
Liverpool -	Lancashire -	53.24 N.	2.59 W.	Thos. Bickerton, Esq.
Warrington -	Lancashire -	53.25 N.	2.32 W.	C. N. Spinks, Esq.
Wigan - -	Lancashire -	53.32 N.	2.33 W.	Jephtha Hussey, Esq.
Bolton - -	Lancashire -	53.35 N.	2.19 W.	W. H. Pendlebury, Esq.
Bramley -	Yorkshire -	53.49 N.	1.38 W.	J. N. Radcliffe, Esq.
York - -	Yorkshire -	53.58 N.	1. 3 W.	W. Procter, Esq.
Wst. Auckland	Durham -	54.45 N.	1.40 W.	G. Todd, Esq.
Rothbury -	Northumberld.	55.25 N.	1.50 W.	E. C. Summers, Esq.
Lerwick -	Shetland Isles	60. 9 N.	1. 8 W.	G. W. Spence, M.D.

QUARTERLY STATEMENT—No. X.

[*The dates denote that the disease appeared in the weeks then ending.*]

SCARLET FEVER.

Canterbury..Mar. 13-20, April 10-17, May 8-22
Swansea..All April, May 8-15,
Bedford..April 10-17
Beccles..March 20-27
Thetford..April 10, 24
Dudley..March 20, all April
Barrowden..May 1
Pontesbury..All March
Burton-on-Trent..May 15, 29
Wrexham..Mar. 20-27, all April & May

Liverpool..Every week [1-15 29
Warrington..All Mar., Apl. 3 17, May
Bolton-le-Moors..March 6-20 April 17-24, May 1-15
York..March 13-20, April 10
West Auckland..All March, April 3
Rothbury..May 15

MEASLES.

Chatham..March 27
Wandsworth..April 24
Upper Holloway..March 20, May 8-15
Saffron Walden..Mar. 13-27, all April
Bedford..All Mar., April 3 [& May
Newport Pagnell..May 1
Sharnbrook..All March, April 3-10
Stourbridge..May 15
Dudley..Mar. 6, 20, Apl. 10-24, May 1,
Wisbeach..March 6-13 [15-29
Pontesbury..Every week
Nottingham..April 10
Hawarden..April 24, May 8-15, 29
Lincoln..Mar. 27, April 3-17, May 8-29
Alford..March 6, May 1
Gainsborough..Every week
Liverpool..Mar. 6, 20-27, May 1, 15, 29
Warrington..April 10-24, all May
Bolton-le-Moors..March 20-27, April 10-24, all May
York..Mar. 13-20, April 3-17, all May
Rothbury..April 10-24

SMALL-POX.

Canterbury..April 17-24
Chatham..March 20
Swansea..May 22-29
Sharnbrook..April 3-10
Stourbridge..Ma. 6, 20, April 17, May 29
Dudley..Mar. 6, 27, April 3-10, all May
East Dereham..All May
Nottingham..May 29
Burton-on-Trent..May 29
Liverpool..Every week except Mar. 13
Bolton-le-Moors..Mar. 27, April 3-17,
York..April 3-17, May 8-22 [May 8-22
West Auckland..All March
Lerwick..April 3

HOOPING COUGH.

Canterbury..All Mar., Apl. 3-17, May 1-
Chatham..March 6, April 10-17 [22
Wandsworth..April 24, May 1
Putney..April 17 [May 1-8
Upper Holloway..Mar. 6-20, Apl. 10 24,
Swansea..All March and April, May 1-8, 22
Saffron Walden..All Mar., April 3-10
Bedford..All March & April May 1-8
Newport Pagnell..Every week
Sharnbrook..Every week
Wellingborough..All Mar., April 3-10
Beccles..March 6-13, 27, April 3
Stourbridge..March 27, April 24
Dudley..Mar. 13, 27, Apl. 3, 17, May 1,
Barrowden..Every week [15-22
Wisbeach..All May
Pontesbury..March 6-20, May 8-29
Nottingham..Mar. 6, April 10, May 15
Oswestry..Every week
Wrexham..April 24, all May
Lincoln..March 6-13
Gainsborough..May 29
Liverpool..Every week
Warrington..Every week
Bolton le-Moors..All Mar., April 3-10,
Bramley..Every week [May 1-15
York..March 13-20

CROUP.

Canterbury..April 10-17, May 8-15
Chatham..April 3, 17
Upper Holloway..Mar. 27, April 10-17
Swansea..March 20-27, April 3
Saffron Walden..May 1, 22
Bedford..March 27
Newport Pagnell..April 10, 24, May
Beccles..May 1 [15-22
Thetford..April 17, May 8
Stourbridge..May 1
Pontesbury..March 13-20
Nottingham..April 3, May 15-22
Burton on-Trent..March 27, May 29
Oswestry..All May
Wrexham..March 13-20, April 10-24
Liverpool..Mar. 13, 27, all Apl., May 1-8
Warrington..Mar. 20, Apl. 3-10, May 8-
Bolton-le-Moors..April 3-10 [15, 29

CATARRH.

St. Mary's, Scilly..April 24, May 1-15
Teignmouth..March 6, 20, April 10, 24, May 1, 15, 29
Odiham..All Mar., April 3, 24, May 1,
Canterbury..April 3 [15, 29
Chatham..Every week except May 29
Wandsworth..March 13, April 3, May 15-22
Putney..All Mar., April 3-10, May 1-8
Upper Holloway..All Mar., May 1-22
Swansea..Mar. 13-27, April 3-10, May
Aspley Guise..March 13-27 [8-22
Saffron Walden..Every week
Newport Pagnell..All March & April, May 1, 22-29
Sharnbrook..All Mar. & April, May 1-15
Wellingborough..All March & April
Beccles..Mar. 6-20, all April, May 22-29
Thetford..All Mar., April 10-17, May
Stourbridge..April 3 [8-22
Dudley..March 20, April 3
Wisbeach..March 6-13, all May
East Dereham..April 17-24, May 1-8
Pontesbury..March 20-27
Nottingham..Mar. 6, 20-27, all April, May 1-22

Burton-on-Trent..All Mar.&Apl.,May
Oswestry..April 10-24,all May [1-8
Alford..April 24
Gainsborough..Every week
Liverpool..Every week
Bolton-le-Moors..Mar. 6-20, all April
Bramley..March 6-13
Rothbury..Every week
Lerwick..Mar. 6 13,27,April 3-10,24, May 1-8, 22-29

INFLUENZA.

St. Mary's, Scilly..All Mar., Apl. 3-17
Teignmouth..Mar.6-13,all April,May
Odiham..All March [1-15
Chatham..Every week
Wandsworth..March 6, 27, April 3
Upper Holloway..April 10-17
Saffron Walden..Every week
Bedford..March 20-27, April 3
Newport Pagnell..Every week
Sharnbrook..All April and May
Wellingborough..All March, April 3
Beccles..AllMarch, April 10, 24, May 22 29
Thetford..March 6-23, 27, all April, May 1, 15-22
Lincoln..All Mar., April 24, May 1-8
Alford..March 6, April 3-10
Liverpool..Every week
Bolton-le-Moors..Mar. 13-27,Apl. 10-
York..April 10-24, May 8 [17
Lerwick..All Mar., April 10-24, May 1

ERYSIPELAS.

Odiham..March 6, May 1-8
Canterbury..March 6, April 3, May 29
Chatham..March 6, 27
Wandsworth. Mar. 6, 20-27, April 24,
Putney..April 10, 24 [May 15
Upper Holloway..March 13-20
Swansea..April 17, May 22-29
Saffron Walden..Mar. 6,Apl.3,May 29
Newport Pagnell..March 20
Beccles..May 8
Thetford..March 6, April 10, May 8
Stourbridge..May 15
Dudley..April 3
Wisbeach..May 8-29
Pontesbury..March 6-13, May 22-29
Nottingham..May 1
Burton-on Trent..May 22
Wrexham..March 27, April 3-17
Lincoln..May 25-29
Alford..April 3, May 1
Gainsborough..Mar. 6, 20, April 8-15
Liverpool..March 13, 27, April 3, 24, May 1-8, 22
Warrington..Mar.6,Apl.10-17,May29
Bolton-le-Moors..Mar.27,April 3,May
Bramley..March 6 [1-15
Rothbury..May 15

CHOLERA (ENGLISH).

Chatham..March 27, April 3
Hawarden..May 1
Liverpool..March 6, May 29

AGUE.

Canterbury..Every week
Chatham..Every week
Wandsworth..April 24
Putney..May 8
Aspley Guise..May 29
Saffron Walden..April 3,17-24, May 1
Bedford..April 10 24, all May
Newport Pagnell..April 24, May 1-8
Sharnbrook..Mar. 20-27, April 10-17, May 29
Wellingborough .April 24, all May
Thetford..April 10, May 1, 22-29
Barrowden..April 3, 17, May 1, 22
Wisbeach..Every week
East Dereham..April 17-24, all May
Lincoln..March 13-27, April 4
Alford..May 8-15
Gainsborough..May 29
Warrington..March 27

REMITTENT FEVER.

Teignmouth..Mar. 13-27, April 3-10, 24, May 1
Odiham..March 6-13, May 1-15
Canterbury..Every week
Chatham..May 8-22
Upper Holloway..May 1-8
Swansea..Mar. 20-27, April 3-10, May
Saffron Walden..May 15-22 [8-22
Beccles..March 13-20, April 3-17
Thetford..March 6-13, May 8 15, 29
Stourbridge..April 17
Wisbeach..April 24, all May
Nottingham..May 15-22
Oswestry..All March, April 3-10
Lincoln..April 24, May 1-8
Alford..March 27, all April
Wigan..All April and May
Bolton-le Moors..Mar.23 20,all April,
York..Mar. 13-20, April 10-24 [May 8

DIARRHŒA.

Teignmouth..March 13, April 3-10, 24, May 1-8, 22-29
Odiham..Mar.13,April 10, 24, May 22
Canterbury..May 29
Chatham..All Mar.,April 17-24, May 1
Wandsworth..Mar.27,all Apl.May8 29
Swansea..Mar. 6, April 3-17, May 1, 15
Aspley Guise..March 27, April 3-10, May 1 . [May 8-29
Saffron Walden..All Mar., April 3-10,
Bedford..March 6, 27, April 3-10, 24, May 1, 29 [and May
Newport Pagnell..Mar. 13,27,all April
Sharnbrook..Mar.20-27,all Apl.&May
Wellingborough..April 10-24,all May

Beccles..April 17, May 22-29
Thetford..All Mar..April 3,24,May 1-8,
Stourbridge..Mar. 27, April 24 [22-29
Dudley..Every week except April 10
Barrowden..April 17, May 22
Wisbeach. May 8-15
Nottingham..March 6-23, May 1, 29
Burton-on-Trent..March 27
Wrexham..March 6,13
Hawarden..March 6-13, 27, April 17-24, May 8 15, 29
Alford..March 6, 20, April 3 17
Gainsborough..Every week
Liverpool..Every week
Warrington..March 8-29
Wigan..May 15-29
Bolton-le-Moors..Mar.27 April 3 May
Rothbury..May 1-15 [1-15
Lerwick..May 8, 22

DYSENTERY.

Teignmouth March 13, 27, May 22
Chatham..March 6
Wandsworth..Mar.27,April3 10,May1
Putney..April 17, May 1-8
Bedford..April 3 10
Newport Pagnell..April 3-17
Sharnbrook..March 27
Beccles..March 13
Wisbeach..March 6-13
Pontesbury..March 27
Nottingham..March 20 [29
Wrexham..Mar.6-13,April 10, May15-
Gainsborough..All March, April 24, all May [May 1-8
Liverpool..March 13, 27, April 3, 24,
Warrington May 15-29
Wigan..April 24
Bolton-le Moors..May 8-22
Bramley..Mar. 6, April 17-24, May 15
York..May 8, 22

TYPHUS.

Teignmouth..March 20, April 3-10
Odiham..March 13
Canterbury..Every week
Chatham..Every week
Wandsworth..April 3, May 1, 29
Bedford..April 10 17
Sharnbrook..March 20
Beccles..May 8-15
Thetford..March 6,27, April 17, May 1
Dudley..Every week except March 6
Wisbeach..March 6-13
Pontesbury..April 10-24, May 1-15
Nottingham..Mar. 20-27, Apl. 10, May
Oswestry..April 17-24, all May [15
Gainsborough..May 8-29
Liverpool..Every week
Warrington..May 29
Wigan..Map 8-29
Bolton-le-Moors..Mar. 6-13, 27, April 3 10, May 1-8, 22-29
Rothbury..Every week
Lerwick..March 6-20, April 17-24

PUERPERAL FEVER.

Putney..May 1
Saffron Walden..March 27, April 3
Newport Pagnell..May 8
Alford..March 20
Rothbury..May 8
Lerwick..April 17

CARBUNCLE.

St. Mary's, Scilly..May 1-8
Teignmouth..April 24
Canterbury..Every week
Chatham..March 20-27, April 3
Aspley Guise..April 17-24, May 1
Saffron Waldon..March6-13, May8,22
Newport Pagnell..May 8-29
Beccles..March 20, May 8-15
Thetford..March 13, April 10, 24
Stourbridge..May 15-22
Dudley..May 22
Wrexham..April 3-10
Liverpool..Mar. 20, Apl. 3, May 1-8, 29
Bolton-le-Moors..April 10, May 1-8
Bramley..March 6
York..Mar.13-20,Apl.3,17,May1,15,29
Lerwick..April 17

VARICELLA.

Wandsworth..March 6

ACUTE RHEUMATISM.

Wrexham..All March, April 3-10

ADDITIONAL OBSERVATIONS.

St. Mary's, Scilly.—Mr. Moyle states that the quarter was very healthy.

Canterbury.—Mr. Rigden writes: "During the past quarter there was less than the usual amount of sickness observed at this period of the year. Most of the cases of scarlet fever assumed a mild character. Hooping cough continued to prevail throughout the winter months; but with the return of warmer weather the children with this complaint did not re-

quire medical attendance. More than the usual number of patients were afflicted with intermittent and remittent fevers, also with intermittent neuralgia; but these were generally much relieved by the administration of sulphate of quinine. Continued fevers still prevailed, but were mostly limited to the lower parts of the city, where the poorer classes reside. There was but little if any abatement in the number of patients afflicted with furunculoid diseases. During the month of March there were deaths registered as resulting from scarlet fever, typhus, hooping cough, and catarrh; during April from scarlet fever, croup, and small-pox; during May from scarlet fever, fever, and diarrhœa."

Mr. Haffenden has forwarded the following quarterly returns, which has been drawn up by the Epidemiological Committee of the East Kent and Canterbury Medical Society.

"*Abstract of Meteorological Observations for the Spring Quarter*, 1857.

	March. Deg.	*April.* Deg.	*May.* Deg.
Highest temperature in the day time	50	55	66
Lowest	32	38	44
Mean	40·90	46·43	55·22
Highest temperature at night	49	50	56
Lowest	26	32	37
Mean	36 61	38·93	46·58
Highest reading of barometer	30·36	30·14	30·11
Lowest	29·12	28·85	29·44
Mean	29·758	29·465	29·836
Amount of rain in inches	1·10	2·11	1·23

Direction of wind (the number indicates the number of days certain winds prevailed). *March*—NE. 1, E. 4, SE. 5, S. 4, SW. 6, W. 0, NW. 5. *April*—N. 5, NE. 2, E. 2, SE. 2, S. 6, SW. 6, W. 6, NW. 1. *May*—N. 5, NE. 10, E. 3, SE. 2, S. 2, SW. 7, W. 2.

Abstract of the returns of Zymotic diseases during the Spring Quarter, 1857.

"The number of cases of zymotic disease, reported during the spring quarter, was 104; being a great decrease in the number of the same quarter last year. Five cases have proved fatal; two from scarlatina; two from continued fever; and one from typhus. Of scarlatina, twenty-two cases were returned; this shows a great decrease on the previous quarter. Two of the number died. One of these was a female twenty-three years of age, who was a patient in the hospital, and had been under treatment there a month, with strumous disease of the elbow-joint. The eruption was very vivid, but the throat symptoms were not severe; she died from exhaustion four days after the commencement of the attack. There had not been any scarlatina in the hospital for a considerable period prior to this case; nor has there been any since. This case occurred

in April. The other fatal case from scarlatina was a female eight years of age, who suffered from malignant tonsillitis, had a rigor on the eleventh day, followed in a few hours by anasarca, and died on April 18th, from apnœa and exhaustion. Under the head of fever twenty-two cases were recorded, though not all of the same class. The larger proportion was continued; only one of the number was typhus, and that proved fatal, in a female fourteen years of age. The disease was complicated with pneumonia. Two deaths occurred from continued fever; both in young female children. Ague was more prevalent in Canterbury and the neighbourhood in the last quarter, than for very many months past. Thirty cases were reported, all of which recovered. The tertian type was by far the most common, and next to it the quotidian; only one or two of the quartan were noticed. Quinsy was noticed by one or two observers as being rather more prevalent than usual at this time of year; seven cases came under notice, which all recovered. Of diarrhœa, five cases only were returned; these occurred in the month of April, and were mild in character. Erythema and erysipelas appeared in a few instances; not quite so many cases were returned as in the last quarter."

Chatham.—Dr. Brown writes: "The wind was easterly during fifty-one days of March, April, and May. Cases of influenza were very numerous, but less fatal to the aged than usual. Diarrhœa prevailed; and there were a few cases of Spring cholera. Typhoid fever, attended by great adynamia, and succeeded by pyæmic abscesses in the neck, and by dropsy, was prevalent in April and May. The localities that suffered most were the low lying parts of Rochester, which yielded the bulk of the cholera cases in former years. Some cases occurred on St. Margaret's Hill, but they were confined to a few houses, in a very defective hygienic condition, tenanted by poor people. Typhoid fever in Rochester and Chatham usually turns on the fourteenth or seventeenth day; but in the present epidemic, although some cases turn early, many go on to the twenty-eighth day. One case terminated on the twenty-first day by laryngitis. I have not seen a single case of typhus during the last three months. Remittent fever appeared in May, amongst children. This is a rare fever in Rochester and Chatham. The cases were characterised by head symptoms; viz., drowsiness, flushed face, startings, delirium, vomiting, costiveness, frequent pulse, strawberry tongue, and dilated pupils. The throat has been affected by diphtheritis. There have been paroxysms of vomiting, with aggravation of head

symptoms, followed by remissions. One case died from convulsions,—probably by the supervention of cephalitis. I mistook the nature of the case, and registered it as acute hydrocephalus —fifteen days. But it began with catarrh and hoarseness, and epistaxis occurred during the course of the complaint. Another case died with symptoms of inflammation of the liver. This case was also mistaken. It was registered as diphtheria—hepatitis. The treatment that speedily cures these cases, is free leeching of the head, with purgatives. No quinine has been used. Intermittent fever prevailed in its masked form to a greater extent than I have ever known it to do in this place. One case of well marked quartan fever was attended by alarming symptoms,—blue collapse, with quasi-mania. It readily yielded to quinine in large doses. The incomplete form of ague was the most prevalent. The symptoms were cold sweats, sense of constriction round the head, eye-brow ague, face-ache, arm-ache, malarious sciatica, etc. The last case of melæna occurred last quarter (end of February)."

Wandsworth.—Mr. Nicholas reports disease of the zymotic class to have been trifling, both in amount and intensity, during the past quarter.

Putney.—Mr. Whiteman says: "Not a single death resulting from zymotic disease was registered in this sub-district during the quarter. Diarrhœa prevailed at the early part of May, two or three somewhat severe cases coming under treatment about that time. Catarrhal affections were noticed in nearly every week. There occurred in my practice, during the thirteen weeks, two cases of erysipelas, one of hooping cough, and one of puerperal fever. Of small pox, scarlatina, or measles, I had not a single case during the quarter; nor have I heard of the occurrence of any cases in this parish. The case of ague in May was imported from Sheerness. There was a most manifest improvement in the public health of this parish during the quarter; and I anticipate a still greater one when the drainage operations, now in progress, are complete. The deaths from zymotic diseases, during the year 1856, were thirteen in number; and, with scarcely an exception, they took place in localities entirely undrained, where cesspools abounded, and where consequently the well water was of the worst description."

Swansea.—Mr. Michael writes: "The past quarter, like the preceding one, was marked by great comparative immunity from disease. Several cases of sudden death, however, occurred. Hooping cough gradually declined in severity and extent, and scarlet fever too almost, if not entirely, disappeared. A case

of this disease, however, occurred on May 8th, proving fatal from blood-poisoning in thirty hours; the other children attacked, two in number, had the disease in a mild form. The house was in an elevated situation on the east side of a hill, facing the sea. Two cases of small pox occurred, both imported; one was a German girl, recently arrived from Cardiff, where the disease was epidemic; the other, from Briton Ferry, in the neighbourhood of Neath, where cases had also occurred. Both were cases modified by vaccination, and terminated favourably. No other cases have occurred."

Aspley Guise.—Dr. Williams states that the stormy and changeable weather of the past spring produced a prevalence of pulmonary affections in animals, and in the human subject. In the former some cases were fatal.

Saffron Walden.—Mr. Spurgin writes: "Vegetation was somewhat backward at first from the coldness of the atmosphere in the earlier part of the quarter; but it is now proceeding very favourably, with a promise of good crops of fruit and corn. Animals were generally healthy, from the dryness of the season. Measles were very prevalent in this district, generally of a mild character. Few fatal cases occurred; none in my own private practice."

Mr. Stear says that measles extensively affected both children and adults. In many instances bronchitis followed, and was fatal in several cases. Vegetation was very healthy.

Thetford.—Mr. Bailey sends the following observations: "March, 1857. The weather during this month was very variable, and the fluctuations of the barometer were sudden; the mean of atmospheric pressure for the month was 29·80°, and the range 14·10°. The amount of rain was under half an inch. The mean temperature of the month was 47°, and the range, from the highest to the lowest, 38°. From this variation of climate we had under notice several cases of catarrh and influenza, which may be considered epidemic. The latter, in some elderly people, proved fatal. With children exposed to the cold winds, and in very young infants, many cases terminated fatally in a few days. Two cases of remittent fever occurred in labouring men, who, from great poverty and exposure to the wet and cold, became affected with the disease, which continued some days. Occasionally a relapse took place; but as the temperature increased, they ultimately entirely recovered. Erysipelas occasionally made its appearance, even in those who were never subject to it before, producing much febrile action, and lasting many days, leaving the skin exceedingly sensitive to the cold airs, etc. Diarrhœa was very pre-

valent throughout the month, both in children and in adults, and also in women during their month of confinement. The great exhaustion occasioned by it required a considerable time to recover, and in some instances relapses took place. It was more epidemic than I have known, at this season, for many years. Pleurodynia also prevailed among the working classes, attended sometimes with cough, but more generally without. So severe were some cases, that perfect inability to work ensued, and the cases required active treatment. Many cases of rheumatism, tic douloureux, sciatica, cynanche tonsillaris, and two cases of continued fever, occurred during the month, probably from the influence of the weather. The casual diseases of the month were hæmoptysis, abortion, hydrocele, hysteria, abdominal dropsy, spasms, dyspepsia, uterine cancer, and some cutaneous eruptions. In this locality, a great mortality existed amongst the flocks: many farmers having lost their ewes and lambs from the murrain, which, by the shepherds, is attributed to the artificial manures, rendering the turnips too rank and less nutritious. May not this state be caused by a certain effluvium, or miasma, emanating from the soil which has been highly manured in this way? Pneumonia, sore throats, and febrile affections, were prevalent this month among the horses and cattle.

"April. The temperature of this month gave, comparatively, two summers and two winters. During the first fortnight it was warm, the thermometer rising to 65°, and then falling on the 12th to 50°, and in the evening to 37°, and on the grass to 30°. For four or five days it continued very cold, and severe frosts occurred at night. Afterwards summer commenced again; the temperature rose to 67° degrees on the 19th for a few days. But from the 23rd to the end, the month was cold, with hailstones, snow, and sleet; the night temperature was many degrees below the freezing point. These changes had much effect upon the human system, and produced many rheumatic cases, cynanche tonsillaris, and one fatal case of croup in a boy four years of age. Catarrh and influenza were also very prevalent. Two cases of scarlatina occurred in the neighbourhood; but these I believe to have been taken from a distant place where they had visited. It did not extend any further. Erysipelas occurred in one case only; it attacked the head and face, producing much constitutional derangement, but terminated favourably. Diarrhœa was not so prevalent this month; two cases only came under observation. Bronchitis and pneumonia, from the sudden changes, were more general. Continued fever occurred in one case only, in an

elderly workman; it arose from great exposure to heat and cold, the man being a blacksmith by trade. Two cases of furunculus occurred during the month; one in a gentleman, who had eight at the same time, in various parts; they confined him entirely to his bed for many days, producing great constitutional irritation, and much fever. This complaint has been very prevalent of late, attacking the working classes, as well as others in the higher grade of life. It seemed to be the epidemic during the month. The casual diseases under treatment were apoplexy, menorrhagia, gastralgia, uterine cancer, gonorrhœa, gout, ophthalmia, and hæmorrhoids. Similar diseases as in last month still continued among the cattle, and especially sheep, but not to the same extent.

"May. During the early part of the month, the temperature did not reach higher than 55°, even in the middle of the day, but at night, and on the grass, it was as low as 28°; and for several nights we had frosts, which damaged the young potato plants. The following week the temperature increased; and on the 15th it rose as high as 75°, and at night, the same day, sank to 41°—a difference of 34°. These changes gave rise to pectoral complaints, which were very prevalent. Cases of catarrh, influenza, bronchitis, and pneumonia, were at the same time under medical treatment; they were not confined to the class who are more exposed and predisposed, but extended to the higher classes, running through families. One serious case of typhus occurred in a poor working lad, of a weak constitution, who had been much exposed to the weather, besides being badly clothed. The disease ran through all its grades, and at the end of five weeks left him in a most weakened state; he is slowly recovering. Influenza and sore throats, quinsy and rheumatic affections, in a few instances, came under treatment; also one case of enteritis, which suddenly attacked a poor man while at work. He was brought from the field home and required the most active treatment; he recovered. Only one case of erysipelas occurred during the month, which attacked the leg. The patient had been occasionally subject to the disease. By the application of a solution of nitrate of silver, he soon recovered. During this month several cases of remittent fever took place, apparently arising from atmospheric influence, as the subjects of attack were in a good position of life. The casual diseases in this month were phthisis, tic douloureux, hepatitis, lumbago, procidentia uteri, headache, and some cutaneous affections. The more favourable state of weather lessened the diseases amongst the cattle; the flocks are doing remarkably well, and healthy.

Record of Deaths in Twenty-one Parishes (population 9,574) from the Registrar's Book.

March.		*April.*		*May.*	
Drowning	1	Hooping cough	1	Bronchitis	4
Hooping cough	1	Bronchitis	1	Pulmonary hæmorr..	1
Debility	3	Convulsions	1	Old age	3
Inflamma. of bowels	1	Senile gangrene of foot	1	Atrophy	2
Diarrhœa.....	2	Chronic asthma	1	Pneumonia	1
Old age	2	Pulmonary hæmorr..	1	Debility	1
Consumption	1	Old age	4	Fever	1
Acute rheumatism..	1	Dropsy.....	1	Convulsions	1
Bronchitis	1	Diarrhœa.....	1	Dropsy.....	1
Jaundice	1	Croup	1	Consumption	1
		Consumption	1		
	14		14		16

Stourbridge.—Mr. Freer says that the cases of small-pox in the neighbourhood were less numerous than in the last quarter. Many cases of chicken-pox, some beginning with severe pain in the back, and high fever, appeared in the localities where a few months ago small-pox was rife. The one case of cholera reported, was in a boy aged six years. The only probable cause was eating rhubarb pudding. Death took place in sixteen hours. Influenza prevailed much among horses, characterised by early and marked debility.

Dudley.—Mr. Houghton writes: "Small pox, which was so prevalent in Dudley in the quarter last reported, when the deaths were fifty, somewhat declined during this quarter, the deaths being reduced to twenty-eight. Its place, however, was taken by measles, which caused twenty-four deaths. Hooping-cough and croup must be added to the new causes of mortality this quarter; the former caused five, and the latter eight deaths. The deaths from scarlet fever were 2; from erysipelas, 3; from diarrhœa, 16; from fever, 10; and from convulsions, 39. Diarrhœa, fever, and convulsions, continue to afford a constant addition to the mortality tables of Dudley. The great majority of the convulsions take place in children, whose health is impaired by the vitiated atmosphere in which they live. In two cases, hooping cough and measles occurred together. One patient, suffering from an attack of lepra, was seized with modified small pox, which seemed to have the effect of arresting the cure of the lepra. The deaths registered in Dudley for the last thirteen weeks, amounted to 366; the average for eight spring quarters was 238; hence the mortality was in excess of the average by 128; 105 of these deaths arose from zymotic diseases; the proportion of zymotic deaths to the whole being as 1 to 3·485. In London, at the corresponding period, the deaths were 14,232; the zymotic deaths, 2,459;

the proportion of the zymotic deaths to the whole being as 1 to 5·786. The average number of deaths for ten corresponding quarters was 14,380. Consequently the deaths in London for the time specified, were 148 below the average. Thus the mortality of Dudley was greatly in excess of the average, whilst the mortality of London was much below it; and the proportion of zymotic deaths in Dudley was nearly twice what it was in London. No better proof can be given of the sanitary state of Dudley, and of the necessity for active sanitary interference. The readers of the *Sanitary Review* will have no difficulty in recognising the causes of this sad state of affairs, for which nothing is yet being done."

Barrowden.—Mr. Swann says that hooping-cough was severe at North Luffenham during the quarter. In two cases it produced great emaciation, with dyspnœa; several of the cases were attended by extreme ulceration of the fauces: iodide of potassium, with a tonic, had a remarkably beneficial effect. One death only occurred out of a great number of cases. During April, particularly at its commencement, bronchitis prevailed, and quickly removed some old people. In the latter part of the month the wind changed to north-east, the weather being dry and bitterly cold; several cases of rheumatism then appeared. Of ague there were several cases; one only at Barrowden, the others at Fineshade. It has been in the latter place three years. The cause of its outbreak and continuance is not known; but circumstances seem to point to its connection with water supply.

East Dereham.—Dr. Vincent writes: "A few cases of small pox were after vaccination; the disease was mild. There were no very bad cases, even when, as was the case in many, there had been no vaccination. One patient, who had previously (according to the parent's statement) well marked small-pox, had the disease for the second time. The pustules were very numerous all over the body. The disease ran a favourable course."

Pontesbury.—Mr. Eddowes states that the cases of typhus occurred in one family only. It was brought from Staffordshire, the neighbouring county, by a young man, one of the sons.

Nottingham.—Dr. Robertson says: "The quarter was a healthy one. The principal diseases were catarrh, croup, diarrhœa (principally infantile), and typhus. The latter was fatal in six cases, all in the lower part of the town. In March the weather was fine until about the 21st, when snow fell, and was succeeded by cold, dull weather, until the end of the

month. The vegetation, which thus received a considerable check, remained in a backward state during the greater part of April, which was cold, and marked by storms of unusual heaviness. In the commencement of May the weather continued unfavourable until the 13th, after which warm showery days continued to the end of the month. The fall of rain was small, being only 1·8 for the whole month. I mentioned in my last report, that pleuro-pneumonia had been prevalent amongst cattle in this district; and I would refer those who are interested in the diseases of animals, to an interesting communication made to the Royal Agricultural Society in May by Mr. Paget, M.P. for this town, in which he states the result of experiments performed in 1853 by inoculating with matter, obtained from diseased lungs, those cattle in his dairy-herd which were attacked with the disease. This plan, which was successful in 1853, had entirely failed recently in the practice of Mr. Pyatt, veterinary surgeon of this town; a very high per centage of deaths resulting from its application. Professor Simonds, of London, who was consulted on the subject, stated his opinion that an inflammation, produced by a seton, dressed with irritating ointment, would be as efficacious as inoculation, and this belief was also held by some well informed men, who had investigated the disease on the continent. Mr. Pyatt tried the seton in some of the hovels where the disease was most rife; and, finding the results encouraging, extended the practice to a considerable portion of the herd. Previous to the application, Mr. Paget lost from 90 to 100 head of stock: more than three animals per week. Since the use of the seton, ten days had elapsed without a loss. The trial has been too short to lead to any satisfactory conclusion; but the further use of this harmless experiment is desirable, that some trustworthy conclusions may be obtained. I subjoin the quarterly table, for which I am, as usual, indebted to the kindness of Mr. White:—

	March.	*April.*	*May.*
Barometer: Maximum	30·22	29·94	29·96
Minimum	28·72	28·63	29·22
Mean.....	29·65	29·11	29·67
Thermometer: Maximum	56·3	68·1	75·2
Minimum	28·3	30·3	34·6
Mean	44·7	46·9	55·1
Ozone	7	5	6
Rain.....	2·3	2·7	1·8
Direction of wind	W.&N.E.	SW.&E.	NE.&E.
Number of deaths	141	104	110
Ditto in 1856	154	157	144

"It is curious that measles, which killed forty-three persons in the corresponding quarter of 1856, was not once fatal in this quarter."

Lincoln.—Mr. Lowe says that there were a greater number of cases of ague during this quarter than usual; remittent fever was very prevalent in the fen districts. In other respects the quarter was more than usually free from epidemic and endemic diseases.

Alford.—Dr. West writes:—"April 11th. There is here, at the present date, quite an epidemic of acute pneumonia among young children. I have for the last three or four weeks scarcely ever been without six or seven such cases on my visiting list. Now, the epidemic of measles is on the decline; and pneumonia is a frequent concomitant or sequela of measles. The pneumonia, which is now prevailing, appears to attack children who do not take measles, or who are insusceptible of that infection. Is it the case with epidemics that when there is a certain amount of insusceptibility—or, which is the same thing, where the infection is wearing out, patients may catch some one symptom of the disease? It is unquestionable with regard to scarlatina and hooping cough, that we have frequent cases of *common sore throat*, when the former is, or has been, epidemic, and of *obstinate spasmodic cough*, during hooping-cough epidemics, with persons who have previously had those diseases, or are otherwise insusceptible of them in their complete form. In my own person, I always catch a sore throat, when in frequent attendance on scarlatina patients."

Gainsborough.—Dr. Mackinder writes:—"Of measles, which commenced at the end of the preceding quarter, we have had an epidemic, and the disease appears only to be abating now in consequence of there being but few houses whose juvenile inmates have escaped the infection. It assumed a mild type, a small minority of the cases only having been accompanied by pulmonic, ophthalmic, enteric, or renal complication. The mortality was insignificant, only two or three deaths having come to my knowledge. Stomatitis, in its various forms, was more than usually prevalent; and dysentery was common among children. A few cases of varicella were observed; but the small pox ceased with the cases reported in my last. I have seen but one person with mumps, one with hooping-cough, and one with gastro-enteric fever, (imported); but diarrhœa and catarrh were scarcely absent during the quarter. I had two or three cases of erysipelas in March and May; a case of puerperal peritonitis in April; and when the hot weather set in, a few of my parturient patients suffered more than common from *post partum* faintings and pains. Rheumatism had a few victims; and a boy with tertian ague came under my notice on May 29th. He had been working for a couple of months in a wood, but was not aware that he had been exposed to the

malaria of decomposing matter. Our mortality was small, and chiefly among the very old and the very young."

The subjoined Meteorological Report is furnished by Mr. Dyson:—"The weather, during the quarter has been remarkably seasonable and genial. The heat was generally in excess, and on the 27th of May, the maximum thermometer indicated 80). During the night of March 4th, it fell to 28); but generally it was slightly above the average. The development of ozone throughout the quarter, was remarkable, as compared with previous observations in this locality: few days have passed in which the test-paper has not been deeply discoloured. The amount of rain in March, was 1·76; in April, 2·63; and in May, 1·76; making a total of 5½ inches; being above the average of the same quarter as compared with previous years."

Liverpool.—Mr. Bickerton has sent the following weekly returns.

"March 6, 1857. During the week there were 221 deaths registered, being 24 below the average. Scarlatina caused 9 deaths; measles, 4; small-pox, 5; hooping-cough, 10; typhus, 4; diarrhœa, 2; convulsions, 11; atrophy, 15; scirrhus, 3; dropsy, 4; heart-disease, 11; diseases of the lungs, 89.

"March 14. There were registered in the week, 193 deaths, being 49 below the average of nine years. The causes were: scarlatina, 10; hooping-cough, 4; croup, 5; diarrhœa, 6; (5 infants); typhus, 1; disease of lungs, 77; disease of heart, 6; disease of brain and apoplexy, 16; convulsions, 16; delirium tremens, 1; dropsy, 9; erysipelas, 1; decay of nature, 24.

"March 21. During the week there were 222 deaths, being 25 below the corrected average. Scarlatina caused 10 deaths; small-pox, 2; hooping-cough, 1; fever, 5; diarrhœa, 4; diseases of lungs, 90; diseases of heart, 5; diseases of brain, 15; convulsions, 14; paralysis, 6; dropsy, 5; decay, 26.

"March 28. The deaths registered during the week were 236, being 13 less than the average. Scarlatina caused 6 deaths; measles, 1; small pox, 3 (2 not vaccinated); hooping-cough, 6; croup, 5; typhus, 1; continued fever, 5; diarrhœa, 0; diseases of lungs, 103 (very unusual); diseases of heart, 8; diseases of brain, 22; convulsions, 16; paralysis, 5; dropsy, 8; debility and natural decay, 32.

"April 4. 235 deaths were registered during the week, being about the average for this period. Scarlatina caused 7 deaths; measles, 0; small-pox, 4; hooping-cough, 5; croup, 7; typhus, 2; diarrhœa, 2; diseases of lungs, 82; diseases of heart, 9; diseases of brain, 20; convulsions, 19; dropsy, 8; erysipelas, 3; intoxication, 2; old age and debility, 23.

"April 11. During the week, 204 deaths were registered, being 22 less than the average. Scarlatina caused 5 deaths; measles, 0; small-pox, 0; hooping-cough, 5; typhus, 4; simple fever, 6; croup, 2; diarrhœa, 1; diseases of lungs, 85; diseases of heart, 7; diseases of brain, 15; convulsions, 21; paralysis, 3; diseases of liver, 2; dropsy, 3; debility and old age, 27.

"April 18. 195 deaths were registered, being 31 less than the average. Scarlatina caused 5 deaths; small-pox, 3 (2 not vaccinated); hooping-cough, 10; diarrhœa, 2; fever, 4; croup, 2; diseases of heart, 4; diseases of brain, including 7 from apoplexy, 16; convulsions, 15; diseases of liver, 3; dropsy, 2; debility and old age, 24.

"April 25. The number of deaths reported during the week was 285, being 18 more than the corrected average. Scarlatina caused 3 deaths; measles, 1; small-pox, 4; hooping-cough, 8; fever, 7; croup, 2; diarrhœa, 7; diseases of lungs, 68; diseases of heart, 10; diseases of brain, 12; convulsions, 30; paralysis, 2; dropsy, 6; excessive drinking, 1; old age, 36.

"May 2. 194 deaths were registered, being 28 less than average. Scarlatina caused 6 deaths; measles, 1; small-pox, 3; hooping-cough, 6; fever, 5; croup, 3; diarrhœa, 4; diseases of lungs, 72; diseases of heart, 3; diseases of brain, 19; convulsions, 15; diseases of the liver, 4; dropsy, 2; wasting and decay of nature, 21; old age, 3.

"May 9. There were 241 deaths registered, being 20 more than the corrected average. Scarlatina caused 11 deaths; small-pox, 4; (3 not vaccinated) hooping-cough, 14; diarrhœa, 6; typhus, 4; croup, 6; syphilis, 2; gout, 1; delirium tremens, 1; diseases of lungs, 80.

"May 16. There were 236 deaths registered during the week, being 7 more than the average. Scarlatina caused 9 deaths; measles, 1; small-pox, 3; chicken-pox, 1; hooping-cough, 12; typhus, 6; diarrhœa, 5; syphilis, 3; diabetes, 1 (a boy aged 5); delirium tremens, 1.

"May 23. The number of deaths registered during the week was 192, being about 30 less than the average. Scarlatina caused 11 deaths; small-pox, 1; hooping-cough, 16; typhus, 6; diarrhœa, 5; syphilis, 1; diseases of lungs, 54.

"May 30. There were 206 deaths registered, being 14 less than the average. Scarlatina caused 7 deaths; small-pox, 2; measles, 1; typhus fever, 13; diarrhœa, 3; diseases of lungs, 66."

Wigan.—Mr. Hussey writes: "Hooping-cough has prevailed at Ashton, five miles from here; the particulars I have not received. Small-pox is very rife at St. Helen's, twelve miles from Liverpool, and fatal in many cases. I had lately, in

this village, a severe case of choleraic diarrhœa, with cramps and prostration, which recovered; and a remarkable case of lead palsy, from drinking water from a lead cistern. Remittent fever of children proved fatal in the majority of cases, owing to neglect in the treatment of head and chest symptoms. I cannot hear of any epidemics in cattle in this quarter. Crops in general look full and healthy. Potatoes are failing in many instances in which *sets* have been planted or sown, but not so where the seed has been *set whole*. I never saw paupers in my district so free from disease as they are at present, and, as they have been, for three months past. We have had a dreadful case of gangrenous stomatitis here within the last three months, in a locality badly ventilated and badly drained. The subject of it is a married female, aged about twenty-five years: she is still very ill, and has been so for above two months. Almost all her teeth have come out. The wind, during the quarter, was generally E., S.E., and N.W."

Bolton-le-Moors.—Mr. Pendlebury says: "No particular epidemic was noted during the past quarter. Cases of small-pox were far more numerous, but were confined chiefly to one or two districts, in which there was an evident neglect of vaccination. The majority were mild in type, and yielded readily to treatment. During May, diarrhœa was rather prevalent, and in many cases of a dysenteric character; error in diet was chiefly the exciting cause. Hooping-cough prevailed extensively, and from its having been, in very many cases, complicated with measles, bronchitis, and even pneumonia, increased the rate of mortality in children. A few cases, from the severity of the paroxysms, had marked signs of collapse of the lung, and congestion of the brain causing convulsions and death. I had a severe case of shingles in a female eight months advanced in pregnancy, which got well rapidly from quinine and iron, with occasional laxatives. Cases of favus of the scalp in children, and herpetic eruptions of the face in adults, were very numerous. The wind having held to the east, vegetation has been very late, but with a welcome change, and genial showers, there is a very promising appearance of healthy and abundant fruits and crops."

Bramley.—Mr. Radcliffe writes: "The population of Bramley, according to the census of 1851, amounts to 8,949; the height of the village above the sea is 410 feet; and the principal portion of the population are engaged in the manufacture of cloth. Hooping-cough has been epidemic throughout the winter and spring; and the epizootic, commonly termed *lung disease*, is prevalent among horned cattle. Under the term

lung disease, the farmers and cattle doctors of this district include two distinct forms of disease, one being the well-known epizootic pleuro-pneumonia, the other being a febrile complaint complicated with asthenic pneumonia. In the former affection, after death, the pleura are found in an abnormal state, and the lungs are infiltrated with plastic exudation, which is often found in enormous quantity; in the latter affection the pleura rarely or never shows signs of morbid action, and the lungs are darkly congested, much softened, and the lung-tissue is often broken down and pulpy. An increased prevalence, and a greater degree of virulence of the so-called lung disease in this district during the last three or four years appears to have been due rather to a larger development of the latter affection than of pleuro-pneumonia, although cases of this disease are of frequent occurrence, and both forms of disease may exist at one and the same time among the cattle of a farm-stead. The febrile affection—*malignant catarrhal fever*, if I may so term it—like pleuro-pneumonia, is believed to be highly contagious; but this is doubtful, although it is certainly very infectious, and, like other epizootics, it haunts over-crowded, ill ventilated, and filthy sheds, and commits its greatest ravages in such places. Moreover, when it has effected a lodgment, it is most difficult to be removed; and in several farms in this vicinity it has become necessary to disuse the cattle sheds in order thoroughly to disinfect them."

York.—Mr. Procter says: "The latter part of the quarter was more unhealthy than the former part, and much indisposition prevailed. During April and May small-pox prevailed to a considerable extent. Carbuncular affections, some of them of considerable severity, were very prevalent."

[In the last line but one of Mr. Procter's last Report (p. 102), for "*cramp*," read "*croup*."]

West Auckland.—Mr. Todd states that during the quarter this place and the neighbourhood were unusually free from epidemic diseases. A boy, aged ten years, had scarlet fever, and a month after recovering from this he was attacked by small-pox. He had been vaccinated, and had the disease in a modified form. Scarlet fever was prevailing in the place; but Mr. Todd could not make out that the patient had ever been exposed to the contagion of small-pox.

Rothbury.—Mr. Summers says that the only case of erysipelas resulted from a scald in a woman of a cachectic habit. One case of puerperal fever resulted from extreme incaution on the part of the patient, after delivery of twins by turning, in a case of placenta prævia. The cases of typhus, measles, and

scarlatina, especially of the two last, were mild. There was throughout the quarter a great prevalence of bilious affections, and of bronchitis, the two being frequently combined.

Lerwick.—Dr. Spence writes: "The first three weeks of March were cold, wet, and stormy, with the wind chiefly from the S.W., during the last week the wind prevailed from the S.E. and the weather was finer. During April S.E. winds prevailed, and the weather was showery, especially in the first part of the month. The month of May was fine though rather cold: the prevailing winds were from the S.W. and S.E. A case of small-pox was imported from Liverpool in April, but the disease did not spread. The fever that occurred was contagious, but at the same time appeared to arise from common causes, and almost all the cases originated in localities of which the sanitary state was much neglected: twenty cases came under my notice: there were three deaths, all in persons who were not removed from their houses, and who, therefore, continued exposed to the predisposing causes. The number of deaths from all causes during the quarter was 16: the average age was forty years; 4 were above seventy, and 5 below five years. The causes where I have been able to ascertain them were: gastric fever, 3; phthisis, 2; influenza, 1; erysipelas, 1; hydrocephalus, 1; convulsions, 1; debility from birth, 1; ileus, 1; and delirium tremens, 1."

During this quarter, the Association of Medical Officers of Health, have brought out weekly tables, showing the progress of disease in their various districts. These reports are kindred with those we have now been supplying for more than two years in this section of the *Sanitary Review*; and, in our next number, we shall embody the main facts of the metropolitan returns with ours.

One passage in the remarks on these returns, for the week ending May 23rd, is of great value.

"In last week's return it was stated that the amount of water flowing down the rivers which supply London appears to be rapidly diminishing, as evidenced by observations on the river Lea. On the 23rd inst., when the water was again measured on the weir at Stonebridge Lock, a further diminution in its depths of nearly an inch was found to have taken place in the short space of a week, and this notwithstanding the fall of ·41 in. of rain which had occurred during the same period.

"This interesting fact, first pointed out by Mr. Pittard, the officer of health for St. George-in-the-East, has doubtless a much more important bearing upon the public health than would at first sight appear. It seems highly probable that if similar observations were regularly instituted upon the amount of water flowing down the Thames, a corresponding diminution would be found to have occurred in that river also. If

this supposition should prove correct, and assuming the amount of solid impurity poured into these rivers *above* the points from which the water for the supply of London is drawn by the several water companies to be *constant*, it follows that when the quantity of water has been thus reduced (as during the last six weeks has actually been the case) no less than *two-thirds* its previous amount, a given quantity of drinking-water must contain *one-third* more of solid impurity than it did six weeks ago. May not this circumstance have some definite relation to, and in some measure at least afford an explanation of, the amount of diarrhœa which so constantly prevails in this metropolis during the summer months ?"

The sheet of the Metropolitan Officers of Health contains also a return of the meteorology of London. There are here some inaccuracies. It would be well if this department (should the scheme progress) were put under the entire direction of Mr. Glaisher.

SANITARY LEGISLATION.

THERE has been a great deal of talk about Medical Reform, but all talk. A Bill from Sir George Grey intends to transform the Board of Health into a branch or Committee of Council; which is the same, virtually, as presenting the Chiltern Hundreds to an honourable M.P. Mr. John Bull is consoled by the feeling that he can do without the Board, and will save by his loss as much as £4000 per annum. Sound logic, John, as based on recollections of the past. But oh, John Bull, John Bull, if you knew what could be done for sanitary science, and for your own health, to the tune of £4000 a year—if you knew what statistics of disease could be collected—what grand experiments could be made, such as would immortalize your England of this age—what facts and laws could be educed—what a promise of increasing national health and national wealth (the child of which is national happiness) could be secured, all for the said paltry sum which you for years have let placemen sink in their own funds—you would certainly abolish the present "how do you do, none the better for seeing you" concern, to replace it as certainly with something which you would be the better of seeing. The past Board of Health has in earnestness been a mistake, a squander, and almost a joke from the first. At its christening its parents mistook its name; and now, in its brief decline, did it wish to leave the world with a clean breast, how well it might confessing say, that it has done those things which it ought not to have done, has left undone those things which it ought to have done, and that there has been no health in it. Let us be just; a few reports of this Board have been worth the reading—a dozen perchance; give line, and say two dozen. But compare these with the amount of individual and unpaid effort which has appeared in the same period; and the science squalor of the Board becomes, by comparison, too pitiable even to be laughable.

Now, sanitarians all and true; you who believe that in the knowledge of life laws, written by nature, is embodied a knowledge of the fundamental laws on which good government will ultimately rest—you who see in this day's sanitary labour a pass word for yourselves to next day honour—you who connect the physical and the mental life as in union inseparable,

and as coming equally from the Supreme — you who work in hope, and in the assurance that whatever little you do is towards the regeneration of your country—you who know that England is still an unweeded garden, and requires vigorous cultivation—yes, all of you, work on, and in spite of Boards of Health, or no Boards of Health, the time will come when your science-goddess will reign.

REPORT ON THE WATER SUPPLY OF THE METROPOLIS.

Dr. Hassall, in an official report on the drinking water of London, concludes thus :—

"It follows that the metropolis is still supplied with water containing considerable numbers of living vegetable and animal productions, and which are not present in the purer waters, as, for example, that supplied by the Plumstead, Woolwich, and Charlton Company. Contrasting these results with those obtained by the microscopical examinations of the waters supplied to the metropolis in 1854, that is, prior to the new act coming into operation, great improvement is undoubtedly manifest in the condition of the present supplies, as shown by the colour and taste of the waters, as well as by the diminished number of organic productions contained in them. It should be recollected, however, that the present examinations have been made in the midst of winter, that is, at the period most unfavourable to the development of animal and vegetable life ; the water now supplied to the metropolis is therefore in the purest state of which, under the present arrangements, it is susceptible. It is obviously proper that fresh examinations of the waters of the several companies should be made in the spring, summer, and autumn, in order that their conditions at those seasons might be determined. A very excellent test by which the quality of water may frequently be judged of, is the colour presented by it : this can only be judged of by viewing the water in bulk, that is, in a clear white glass bottle, or better still, in a porcelain dish, holding about a gallon, some distilled or pure spring water being placed in a corresponding dish for comparison. If the water thus viewed present any decided tinge or colouration, it in general is not pure. Inspected in this manner, the waters of the whole of the companies examined presented a very marked yellowish green colouration, which became more obvious as the water was concentrated by evaporation."

REPORT ON DISINFECTION AND DEODORISATION.

A report on these subjects is by Mr. Lindsay Blyth, Analytical Chemist to the General Board of Health. Mr. Blyth states that the so-called disinfectants are of two classes :—"First, those which fix the organic matter in a form unfavourable to oxidation, and thus reduce to the utmost its tendency to undergo chemical changes—*Antiseptics ;* secondly, those which more or less rapidly break up the organic matter by promoting its oxidation and conversion into unputrefiable products—*Disenfectants.* The materials employed against those cases which are characterised by offensive smells are spoken of as *deodorisers ;* which word has thus come to be popularly used as equivalent to 'disinfectants.' This error should be guarded against, for there is no proof that the specific power of producing fever, small-pox, or cholera, is necessarily associated with any odorous matter. Sulphuretted or phosphoretted hydrogen may be smelt in places where there is no power of infection ; while in others, the mere absence or destruction of such

odours, is not sufficient security against infection." He enumerates as these disinfectants fumes of nitric and nitrous acids, manganates and permanganates of potash and soda, fire, quicklime, and charcoal. For the disinfectants of occupied buildings, Mr. Blyth refers to chlorides of lime, soda, and zinc, and the manganates. Nitrous acid, chlorine, and sulphurous acid may be used in unoccupied buildings. For the disinfection of clothes he recommends exposure of them to heat, and in the appendix gives a brief account of Jeakes' and of Johnston's apparatus for this purpose. The appendix also embodies a report by Professor Hofmann on the manganates and permanganates of soda and potash, as applied by Mr. Condy of Battersea. The manganates give off their oxygen to bodies around them with great facility; hence their disinfecting power. Dr. Hofmann thus writes:—"The manganates and permanganates surpass in their deodorising and disinfecting powers most compounds which are usually employed for this purpose. Metallic salts, such as the compounds of lead, iron, zinc, etc., act extremely well, if the odour to be removed arise from sulphuretted hydrogen and ammonia, or substances analogous to the latter; when a metallic sulphide and a salt of a metal ammonium is formed. But, frequently, the odour belongs to substances of a different class, which are fixed by neither of the constituents of the metallic salt. The odour of the water, which in my experiments yielded perfectly to the action of the manganates, was scarcely altered by the use of very considerable quantities of the usual metallic salts. Moreover, the offensive substances are not destroyed by metallic salts, but only fixed; they appear again—the sulphuretted hydrogen by the action of an acid, the ammonia like compounds by that of a powerful fixed alkali. The manganates and permanganates, on the other hand, destroy the smelling substances completely; containing, as they do, a large quantity of oxygen, the very agent which accomplishes all natural disinfection, they give rise to an actual process of combustion, in consequence of which the cause of the odour or putrefaction is permanently removed. They resemble, in this respect, the alkaline hypochlorites, such as hypochlorite of potash, soda, or lime (chloride of lime), the action of which is likewise permanent. The hypochlorites act with less energy and rapidity than the manganates, and are in this respect inferior; but they have an advantage over the latter by their evolving chlorine in the gaseous state, and destroying in this manner odorous and putrefactive substances which are diffused in the atmosphere. But as the chlorine evolved is frequently found objectionable by, and injurious to, patients, it would be important to ascertain whether the same effect could not be accomplished by exposing the contaminated air to the action of extended surfaces of solutions of the manganates and permanganates, either contained in shallow vessels, or diffused over sheets of wire gauze. The manganates and permanganates have, moreover, the advantage of possessing peculiar and strongly marked colours, whereby they are readily and safely distinguished from other compounds. In consequence of this marked colouration, accidents which have been frequently caused by the incautious and erroneous use of hypochlorites, or of metallic salts, are scarcely possible with the manganates and permanganates, which are, moreover, in themselves comparatively innoxious." In reference to this mode of disinfection we have to add, that Mr. Condy has sent to the Editor of the *Sanitary Review* some of the disinfecting fluid, for experimental purposes. The editor has the matter under observation, but his experiments are not sufficiently extended to allow of a report in the present number.

SANITARY REPORTS.

Mr. Alfred Dickens, C.E., Superintending Inspector to the Board of Health, in a Report on Droitwich, in the county of Worcester, states:—

"That the rate of mortality within the borough of Wich, or Droitwich, in the county of Worcester, is very high. That excess of disease may be distinctly traced to the undrained condition of many of the houses, to deficient ventilation, and to the want of a proper water supply. That the highways are badly kept at a large annual cost. That the condition of the inhabitants would be materially improved,

"I. By a thorough system of public and private drainage. II. By a supply of wholesome water laid on, as far as possible, to every house, and by the abandonment of all those wells now in existence, the water from which is admitted by all to be impure. III. By the substitution of more decent accommodation, in lieu of the present filthy privies. IV. By improved surface paving to all the courts, alleys, and highways throughout the town. . . . .

"7. That the application of the Public Health Act to Droitwich is not only necessary at the present time, but it is calculated to be of inestimable service hereafter.

"Whereupon I have the honour of recommending that the Public Health Act, 1848, be forthwith applied to the said borough of Droitwich."

In a Report on Windhill, in the West Riding of York, Mr. Dickens proposed that the Public Health Act should not be extended. In a third Report on Leamington Priors, Mr. Dickens recommends that the parishes of Milverton, and a portion of the parish of Lillington, should be added to the Leamington district. And in a fourth Report, he recommends that the Public Health Act should be applied to the town and Cinque Port of Seaford, in Sussex.

WORKHOUSES AND THE MEDICAL OFFICERS OF HEALTH.

Dr. Septimus Gibbon has forwarded us certain official communications relating to the inspection of Workhouses and Medical Officers of Health. The pith of the matter is, that Dr. Gibbon, in the discharge of his duties, was compelled to make application to the Poor Law Board for permission of right to enter the Workhouse of the Holborn Union, in order to enable him to report thereon as a public edifice. The answer of the Poor-Law Board is in opposition to Dr. Gibbon's very proper demand. The Secretary of the Poor-Law Board writes as follows, to the Clerk to the Board of Guardians.

"The Board, however, while they incline to think that a Workhouse is not a public edifice within the meaning of this section of the Act, do not find that the Act gives the Medical Officer of Health any right or authority to enter the Workhouse for any purpose without the permission of the Guardians of the Union; and the Board are, therefore, of opinion that it is competent to the Guardians to decline to admit him into the Workhouse if they should think fit to do so."

Dr. Gibbon thinks this is a decision which should be made known to all Medical Officers of Health. Precisely. But is it not like all circumlocution decisions and concerns—one department upsetting another? Yet there are people weak enough to think that the disease evils which afflict our country, are removable by intrusting their removal to the circumlocution representatives, rather than to the instinct, energy, and knowledge of the nation at large.

THE

SANITARY REVIEW.

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THE BRITISH JUGGERNAUT IN INDIA.*

SOME fifty years ago, a journey to the Indies in the East was looked on as one of those great adventures which belong only to men of unruly will and magnificent nerve. A kind of solemn mystery surrounded such an exploit: it was like a man with his eyes open travelling into the valley of the shadow of death. Mothers heard of their soldier sons being dispatched to India, and their hearts sank for ever. There was no return, no hope. The farewell was equivalent to death: it was too often a death, a living death, in so far as the ties of home and relationship were concerned. The idea was doubtless somewhat exaggerated, yet not over much. For, at periods more recent than the one we have specified, European regiments in India, especially those of the Company's service, have melted away like the spectres of a dream. A thousand strong men formed this year a regiment; a year passed, and one hundred and twenty-five new recruits were required to fill up the broken column; eight years passed, and not a man of the original thousand remained in that dissolving corps. It was the same regiment, in the same sense as the Irishman's knife—first a new blade, then a new haft, and so on interminably. Not much wonder, then, that the Indian field for distinction should be considered a great grave-ground; not much wonder that the recollection of such facts should still throw a gloom over Indian adventurers.

It was remarkable how long the main cause of this sudden decimation, and unscrupulous transformation of men into bungs and other Shakesperian analogues, lay hidden in the dirt

* A Report on the Health of the First Bombay European Regiment (Fusiliers), from 1st of April, 1846, to 31st of March, 1854. By F. S. ARNOTT, M.D., Surgeon of the Regiment. "Transactions of the Medical and Physical Society of Bombay" for 1855.

An Analysis of the later Medical Returns of European Troops serving in the Bengal Presidency from 1846 to 1854. By HUGH MACPHERSON, Assistant-Surgeon in the Governor-General's Body Guard. "Indian Annals of Medical Science". No. VIII. 1857.

of ignorance and supineness. When men asked men why India was so fatal, the bugbear of an answer gushed out in two words—the climate. There was some truth in the saying, but more suppression of truth than truth itself. It was the climate, truly, in some measure; but it was the climate unstudied, and the man unprotected.

Had we not the authority of an author who has seen and has known, and who is not given to string the long bow and drive the long shaft, we should hesitate to describe what, in those past times, were the true influences and negligences which led to such an useless sacrifice of human life, or to show up the British Juggernaut in India. The Juggernaut was not personified in the warm climate, nor in the battle field, but in grand evils elsewhere—in evils social, in evils sanitary, in evils remediable.

Dr. Arnott's description of the European soldier in India in past days (twenty-five years ago), is too graphic and instructive to be passed over in silence.

"In earlier times the condition of the European soldier in India was in many respects deplorable. Severed, perhaps at an early age, and, it may be, on account of some youthful and venial error, from all who took an interest in, or could advise or direct him, and with all the happy recollections of his boyhood fresh in his mind, the finest feelings of his nature were doubtless soon chilled by intercourse with men who could little sympathise with him. With passions and bodily energies in full vigour; the idleness, the monotony, the restraint, and the necessary confinement of a barrack life, in an ungenial climate, were irksome in the extreme; whilst superior talents and mental faculties could only make him the more pine for joys irrecoverably forfeited. There were, then, few opportunites for mental improvement. Books were scarce, and newspapers, if procurable at all, were of old date, and little interesting. For a season or two after arrival, the earnestly inculcated injunctions of his friends, and his own faithful promises, to maintain a regular correspondence may have been religiously observed; and the interchange of letters may for a while have cherished all his former associations, and kept alive the desire to revisit the scenes of his youth. But without any opportunity of renewing those ties, it is no easy matter, even among the better educated, to continue this regularity of correspondence during twenty years of exile, and at the distance of half the circumference of the globe. Consequently, by the gradual loss of correspondents, by the tardiness and uncertainty of communication, and by various other accidents, letters became less frequent, and old familiar faces and things began to be less distinctly remembered. At length other interests, other views, and other acquaintances springing up, the old associations ceased to be recollected. In many cases, without doubt, the spirit

became broken at the dim prospect of ever revisiting those early scenes, at the despair of meeting those early friends, and at the disseverance of all connection with home. From the real or apparent forgetfulness of relations, the youth may have become indifferent to character and self-respect. He may have endeavoured to drown the recollection of former error, of blighted prospects, of home, and of relatives, in drunkenness and debauchery, which too often terminated in an untimely death. In those times, moreover, everything connected with India was imperfectly understood by the people at home; and more especially by the classes from which recruits are usually obtained. Enlistment into the Honorable Company's army was then deemed equivalent to perpetual exile, or to a certain and early grave. It was too often the last desperate step of men of reckless character, or of ruined fortunes. Mothers, and other relations, consequently looked with dread upon the Indian service, and the better classes of recruits were reluctant to enter it. The prejudices against it unfortunately were not without foundation. The soldier's condition was not then, as now, an object of watchful solicitude. He was worse paid, worse fed, worse clothed, and worse quartered. His rights were ill defined, and little understood. He was more at the mercy of those in authority over him. Punishments were capriciously inflicted. They were often very severe, and not unfrequently of a degrading nature. Parades and drills were long and harassing, and in many of their minutiæ irksome and pedantic (as indeed they are to this day). The services of European soldiers were much required in the field; and regiments and detachments, afloat as well as on land, had to perform severe duty, with a tolerable quantity of hard fighting; whilst the men, ever brave, and every ready to meet and conquer their country's foes, rejoiced in the excitement of active service. On such occasions their gallantry may have been acknowleged, but that was not held as a reason for pampering them with indulgences at the end of the campaign. They who in the tented field had become inured to the fatigues, privations, and asperities incident to military life, could not always calculate on a period of rest, or on being sent to an eligible station; but, being deemed seasoned soldiers, were expected to surrender superior accommodation, climate, and quarters, in favour of others less thoroughly acclimated."

Such was the condition of the soldier in India when the decimation of Indian troops was so severe. The decimation was provided for; and a cruel series of experiments as to the forces that would kill, ended in supplying a world of scientific but dearly bought information.

Lord Ellenborough, in calling the attention of the House of Lords in 1853 to the decimation of Indian European troops, took occasion to compare favourably the troops of Her Majesty's service, with those in the service of the Company. His lord-

ship shewed from the then existing returns, that, whereas a regiment belonging to Her Majesty required renewal each twelve years, a regiment belonging to the Honourable Company demanded such renewal, as we have before shewn, each eight years. Dr. Arnott, commenting on this statement, remarks that, at the time he wrote, 1854, such a contrast was probably not correct. In Her Majesty's Indian forces, so many improvements had then taken place, that, instead of 83⅛ recruits being required annually to keep up the strength of 1000, there were only needed 62½. In other words, a Royal regiment had to be renewed only once in sixteen, instead of, as formerly, once in twelve years. The same improvement had also, according to this writer, occurred, at least proportionately, in the Company's service; such, any way, was his impression.

It were fortunate for India, were these opinions of Dr. Arnott supported by other and later statistical evidence. Turning from his excellent record to the second paper named at the head of this article, we find in the medical returns of European troops serving in Bengal, for the eight years 1846-54, a series of deductions, which mournfully overcast the brightness of the preceding picture. Mr. Macpherson starts forth with a table, shewing the annual average loss from all causes, occurring amongst European troops in Bengal, for a period of eight years, *i. e.* from 1846 to 1854. And what is his summary? This: That the force serving in Bengal loses annually, from one cause or another, 9 per cent. of its numbers; a loss amounting to an annual average of 1,759 men out of 19,517, and to a gross total loss in the eight years of 14,072 men out of an army of 156,139.

Whatever, therefore, may be the position of affairs in the other Presidencies, it is clear that in Bengal a regiment of 1000 men dissolves away in about eleven years, even in favourable times; and this notwithstanding the improved conditions of the men in both services.

In relation to the improvements which have taken place in the Company's regiments, Dr. Arnott thus reports:—

"For many years improvement has been progressive, and the condition of the Honourable Company's European soldier has almost yearly undergone amelioration. His own never-failing gallantry in action, his devotion, his courage, and his patient endurance of toil and privation; and probably, also, the greater experience of his superiors—their better acquaintance with his wants and privileges, and their own increased responsibility, have secured him justice, and contributed in every way to benefit him. The soldier's duty is now more regular; he is less harassed upon parade,

and he is not treated as an unreasoning, brutalised being; severity is not now considered essential to discipline; youthful delinquencies and indiscretions are not now visited by awards less calculated to restrain vice than to convert the thoughtless and unwary into hardened and irreclaimable offenders; and hence there is no motive for the discreditable, unfair, and unmilitary practice of concealing crime. At the same time, however, the smallest dereliction of duty or straightforward conduct, is at once checked by adequate punishments. Drill, duty, discipline, punishments, and the entire interior economy are reduced to a system, and do not depend upon the will or caprice of any one. The soldier is now better paid, better fed, better clothed, and better quartered (although in some of these particulars there is yet much room for improvement), and with rare (but occasionally very glaring) exceptions, he has now the regular tour of the different stations of the Presidency. Commensurate with the additions to his comforts, has been the improvement of the habits of the soldier in the Honourable Company's European army; which, combined with the reputation of its glorious achievements in war, and the high prizes it holds out, have attracted to its standard a better class of recruits; so that men of great ability and intelligence, of respectable birth, of superior social position, and of excellent education, now muster strong in the ranks of every regiment; whilst sobriety is gradually taking the place of drunkenness, and sickness and mortality are yearly diminishing.

"The establishment of steam communication has perhaps benefited no class of men in a greater degree than the soldier. He can now keep up a frequent communication with his friends, and a tolerable acquaintance, not only with his own native district, but with all that is going on at home, and in European and other countries; and hence we find not a few who are well informed on all the leading topics of the day. Each European regiment of the Honourable Company's service is provided with a well managed savings' bank, a capital school, a well selected library, a printing press, a good coffee shop, and an excellent theatre; whilst those soldiers who are clever and expert workmen as tailors, shoemakers, smiths, farriers, carpenters, bookbinders, watchmakers, etc., meet with every encouragement. There are likewise provided for their amusement chess and cricket clubs, and a fives court built by Government, as well as skittles, quoits, and draught-boards. The men play at 'long-bullets', and are permitted to go out shooting, rowing, and fishing, at their discretion, or as opportunities offer. At this station (Aden) there is, however, no shooting, and little available ground for cricket, or for their favourite pastine 'long-bullets'. With a good library to resort to, with schools where he can qualify himself for promotion and higher employment, and with rational amusements, a soldier's intellectual energies need not now be wasted in dangerous or hurtful inactivity, or his mind left to prey upon itself for want of occupation. Under their beneficial

operations, our soldiers are as well behaved in quarters as they are brave before the enemy; and although during the last fifteen months irregularities and drunkenness have been far above the average, yet they are due to a mere temporary ebullition, easily accounted for, and which will gradually subside. Every regiment similarly situated acts in the same way. I am happy, however, to say, that notwithstanding these drawbacks, the deposits in the savings' bank have during the year increased from Rs. 17,700 to Rs. 20,700, whilst the ardent spirits consumed in the canteen have decreased by about two drams per man *per diem*, that is about one-half.

"Improvements in the moral and physical condition of the soldier have progressed as knowledge dawned upon the authorities relative to his requirements. They ever evince the utmost solicitude to add to his comfort, and are unsparing in their endeavours to preserve his health; and, whenever sanitary measures are proposed, they receive the readiest and most mature consideration. In adopting the most efficacious means of preventing disease among the European soldiery, expense is always a secondary consideration....

"Disease is to a considerable extent averted by the strictest attention to his personal economy. He is no longer encouraged, nor permitted, to eat and drink what is noxious; his diet is well regulated, and unwholesome bread and meat are not now imposed upon him by unscrupulous contractors, and passed by officers indifferent to his health and welfare; nor is he allowed to select for his daily rations cheap and unwholesome provisions in the bazaar. Under regulations well considered and rigidly enforced, his ration money is carefully expended; the best articles of diet are provided, and the surplus money returned to him. He is no longer compulsorily initiated into the destructive habit of dram-drinking; nor is he required to pour down his throat a quantity of ardent spirits every morning before breakfast; thus the more surely to induce thirst, and a longing for more spirits, to throw him into a state of fever, and ultimately to destroy the coats of the stomach, and to derange the action of the liver. He can still have two drams daily, beginning after twelve o'clock, but even these he is encouraged to relinquish in favour of coffee, and of sound malt liquor. By a late excellent order, no recruit receives any ration dram until he is dismissed drill. Cleanliness, so necessary for the performance of the function of the skin, is rigidly enforced. Water-sheds are attached to every barrack for ordinary ablutions, and swimming baths are provided in convenient situations, by which the pores of the skin are still more effectually kept open and healthy. The soldier's bedding is an object of daily attention. His clothes are tolerably well adapted to the season of the year, although not of a material suited to the climate, nor of a make admitting of the free use of the limbs and lungs; but, on the contrary, often hurtfully compressing the ribs and abdominal viscera, and affording a very inadequate protection to the person and to the head. The necessity of an ample supply of fresh air to the lungs is now fully under-

stood, and spacious, comfortable, airy, and substantial barracks, well calculated to counteract the effects of heat and climate, have been erected at some, and are in contemplation at other stations of the army; whilst drainage and cleanliness in the vicinity of the barracks are strictly observed. Sanitaria at different stations have been established, and at others experiments to test their utility have, under the authority of the Medical Board, been begun. Some of them have been established with very little regard to eligibility of position, or to any urgent necessity for them; and in some instances the zeal for sanitaria has diverted attention from the requirements of regular cantonments: as, for example, at this station, where there is a capital sanitarium, which may be available for four months in the year for a few sick, whilst the regimental hospital, required every day in the year, is a most miserable and uncomfortable building. The desire is thus, however, equally evinced to benefit the soldier, although I think in a somewhat mistaken direction."

The picture contrasts favourably with the one previously extracted from the pages of the same author; and it is clear to the simplest sense that, if the favourable picture is a correct contrast, the moral, the social, and the sanitary position must be vastly ameliorated and improved, and the British Juggernaut less powerful. Whence, then, the still serious dissolution of men, the loss of an army of 14,000 in the space of eight years in Bengal?

Before this question can be fully discussed, we must, for the sake of those who are not up to medical military statistics, enumerate the modes in which a regiment is destroyed. It must not be supposed that all the men die. The decrement follows in three ways; by *deaths in hospital;* by *deaths out of hospital,* and by *invaliding.* Now, keeping to the loss of the 14,072 in Bengal, for the eight years 1846-54, 5·62 per cent. out of the total force of 156,139 were lost from deaths in hospital; ·74 per cent. from deaths out of hospital; 2·63 per cent. from invaliding. Of the deaths in hospital, 1750 were from fevers; 90 from eruptive fevers; 670 from diseases of the lungs; 68 from diseases of the heart; 816 from diseases of the brain; 3,672 from diseases of the alimentary canal; 1107 from cholera; 74 from dropsies; 19 from diseases of the urinary organs; 86 from venereal affections; 56 from rheumatic affections; 43 from abscesses and ulcers; 136 from wounds and injuries; 11 from diseases of bones and joints; 67 from diseases of nutrition; 1 from disease of the eyes; 18 from diseases of the skin; 2 from diseases of the ear; 40 from drunkenness; and 69 from anomalous diseases; making in all a total of 8,785. Of the deaths out of hospital, 549 were of men killed in action;

9 from wounds received in action; 79 from drowning; 259 from accident; 3 from lightning; 2 from intoxication; 5 from murder; 1 from hanging; 3 from execution; 40 from suicide; 10 from sun-stroke; 70 from apoplexy; 5 from ruptured blood-vessel; 117 in barracks, from causes not specified, 22 from causes unknown (found dead); and 1 from disease of the heart; making in all a total of 1175. The numbers *invalided* amount to 4,112; but it is unfortunate that Mr. Macpherson's tables give the details of the causes of invaliding for four years only, out of the eight, *i. e.* for the four years ending 1853-54. Out, then, of a total of invalided in this period amounting to 2,052 in number, 72 were the results of fevers; 21 of phthisis; 113 of other pulmonic affections; 71 of heart disease; 4 of aneurism; 42 of varix and other diseases of the circulation; 152 of liver disease; 192 of dysentery and diarrhœa; 56 of diseased spleen and other visceral derangements; 34 of hernia; 73 of mental diseases; 43 of paralysis and apoplexy; 40 of epilepsy; 22 of other nervous affections; 5 of dropsies; 29 of diseases of the urinary organs; 48 of venereal affections; 291 of rheumatic affections; 30 of abscesses, ulcers, and fistula; 113 of wounds and injuries; 41 of diseases of bones and joints; 29 of scrofula and scurvy; 182 of diseases of the eyes; 13 of deafness; 55 of expiry of service, or causes unknown; 301 of debility or broken down constitution. Total, 2,052.

Comparing these tables with similar returns from other parts of the world, the average of losses from all the three causes is found to be far above that which occurs in any other of our British troops, whether serving in the colonies or at home.

Entering into a more ample analysis of his facts, Mr. Macpherson explains the influence of age on the mortality of the European soldiers in Bengal; the conclusion being, that below the age of twenty-five the chances of life are better in India and in British America, than in the United Kingdom or the Mediterranean, while after twenty-five they are equal. The period least favourable to life in India, as in England, and in America in a less degree, is that from twenty-five to thirty. The reverse appears to be true on the Mediterranean stations. The influence of length of residence in India on the mortality is also shewn in Mr. Macpherson's tables. His conclusion here is, that of deaths in hospitals, during the eight years already recorded, about one-sixth occurred amongst men who had been less than *one* year in India; more than three-fifths in men who had been less than *five* years; and upwards of four-fifths in those who had been less than *ten* years, Taking it all in all, it may be safely reckoned that fully nine-tenths of the casualties

in hospital were in men who had not completed ten years service; and a similar proportion seems to attend the deaths out of hospital.

Of the 2,052 men invalided in the four years 1850-54, 27 were under twenty years of age; 273 from twenty to twenty-five years; 556 from twenty-five to thirty years; 459 from thirty to thirty-five years; 429 from thirty-five to forty years; 192 from forty to forty-five years; 23 from forty-five upwards; and 3 of unknown age. Thus, while nearly three-fourths of the deaths took place in men under thirty, less than one-half were invalided before that age.

As regards length of service in India, of the same 2,052 invalids, 7 were invalided after one year of life in India; 94 after from one to three years; 240 after from three to five years; 242 after from five to seven years; 314 after from seven to ten years; 436 after from ten to fourteen years; 391 after from fourteen to twenty years; 323 after twenty years: and 5 unknown. Thus the period of from ten to fourteen years contributed most to the invalids.

We have already enumerated the forms of disease and accident which give rise to the mortality and invaliding of the European Indian army. Mr. Macpherson, in some very able and judicious comments, enlarges on this topic, and points out the fact, which English theorists would hardly credit, that, so far from rheumatism being a disease almost unknown in India, one-seventh part of the invaliding in the Indian Presidencies is due to that disease.

Up to this point, we have noticed only the casualties of the Bengal European common soldier. A word about the officers must now have place. Mr. Macpherson has here another instructive table for our guidance, the pith of which is, that the average strength of the officers, for the eight years 1846-54, was in round numbers 712, and the average deaths fifteen, or 2·11 per cent.

Certain other points connected with Mr. Macpherson's statistics, of less importance, perhaps, than those we have supplied, but still most interesting, offer themselves for notice. We must not enlarge here; but, at the risk of repeating some things that have been stated, and to avoid the danger of having omitted the essence of our author's remarks, we give verbatim his own *resumé*. It runs as follows:—

"1. That European troops, serving in the Bengal Presidency, lose annually, from one cause or other, 9 per cent. of their number: viz., about 5·62 by deaths in hospitals, 0·74 by deaths out of hospitals, and 2·63 by invaliding.

"2. That, of the men constituting the European force, two-fifths are under 25 years of age, more than one-third between 25 and 30, and nearly one-fourth upwards of 30: the proportion of men in the middle period being much larger in India than elsewhere.

"3. That below the age of 25, the chances of life for soldiers are better in India and in British America than in the United Kingdom or the Mediterranean; while, after 25, they are nearly equal.

"4. That the period least favourable to life in India amongst soldiers, is,—as in England and America likewise in a less degree,—that from 25 to 30. This is not true of the Mediterranean stations, where the ratio of deaths according to age at all periods is more equable than elsewhere.

"5. That, of the soldiers who die, about one-sixth have resided less than one year in India, more than three-fifths less than five years, and upwards of four-fifths, in fact, fully nine-tenths, have not completed ten years in this country.

"6. That the proportion of deaths out of hospital, even excluding the numbers of those 'killed in action' or 'died of their wounds', etc., is larger in Bengal than in the Colonies.

"7. That the average annual number of suicides among soldiers is about five,—rather a smaller proportion than in most other countries.

"8. That the average annual number of men invalided in Bengal is about 2·63 per cent. of all strength, or 0·68 higher than in the Mauritius, and more than one per cent. higher than in British America, but less than in the cavalry and household troops in England. Of the latter, however, a large number take their discharge on the expiry of their term of service, without any medical reason.

"9. That the principal causes of invaliding in this presidency, are, general breaking down of the constitution and rheumatic affections, each of which yield about fourteen and a half per cent of the whole; the next in order being bowel complaints, eye diseases, liver affections, diseases of the respiratory organs, wounds and injuries, and mental diseases.

"10. That, as might be expected, bowel complaints and liver affections combined, yield one-sixth of the whole number invalided, being more than double the amount at the Cape, nearly eight times the number in the Mediterranean, and more than ten times the number in British America.

"11. That, on the other hand, diseases of the respiratory organs give two and a half times fewer men to the invalids than the same class at the Cape, and five times less than in British America and the Mediterranean.

"12. That one-fifth of the men invalided are under 25 years of age, more than one-fourth between 25 and 30, and more than one-fifth between 30 and 35, and a like number between 35 and 40. So that less than half of the men invalided are under 30, whereas nearly three-fourths of the deaths take place under that age.

"13. That, of soldiers invalided, sixteen and a half per cent. have served under five years, forty-three and a half under ten, and eighty-four per cent. under twenty years: the period of from 10-14 contributing most, and that from 14-20 the next largest proportion.

"14. That, (*a*) the average proportion of sick to strength is, in soldiers, 204·36 per cent.; in officers, 132·25; in women, 126·81; and in children, 78·81.

"(*b*). The average percentage of deaths to strength is, in soldiers, 5·62; in officers, 2·11; in women, 4·45; and in children, 8·41.

"(*c*). The average ratio of deaths to treated is, in soldiers, 2·75; in officers, 1·60; in women, 3·51; and in children, 10·68. While, therefore, the amount of sickness is nearly three times as great in soldiers as in children, its intensity is four times as great in the latter as in the former.

"15. That, both in soldiers and officers, by far the largest amount of sickness is caused by the same classes of maladies: viz., fevers, diseases of the alimentary canal, venereal affections, and wounds and injuries.

"16. That fevers cause the largest number of admissions to hospitals in women and children, as well as in soldiers and officers, giving fifty and a half per cent. in women, and forty-one per cent. in children.

"17. That the classes which contribute most to the general mortality are the same in soldiers, officers, women, and children: viz., diseases of the alimentaary canal and fevers.

"18. That the classes which prove most mortal to those attacked are, in soldiers, cholera and eruptive fevers; in officers, cholera and dropsies; in women, likewise, dropsies and cholera; and in children, diseases of the brain, etc., and cholera.

"19. That, as had been remarked by M. Boudin in regard to tropical countries generally, the annual number of admissions to hospitals, and of deaths, in Bengal, range within very wide limits from one season to another."

The reader is thus in fair possession of the condition of European soldiers in the Bengal Presidency, up to a late date. From all we can gather, the position of the soldiers elsewhere in that vast empire is much of a muchness. Having, therefore, the leading facts regarding the decrement of Indian troops, what facts are known about the causes of such decrement? On this great question, Mr. Macpherson makes but two statements of moment; but these, brief as they are, must be accurately noted.

1. Comparing the losses sustained by the army in the colonies and at home with those in India, he tells us that "climate alone, if the troops were in all respects on equal footing, would not produce the great disparity observable in the rates of mortality. What swells the table of losses is, the great amount of duty in the field which men serving in India have to undergo,

compared with their brethren in arms in the colonies; and the extraordinary risks of sickness incurred by them, in occupying new positions before there has been time to provide fitting shelter."

2. In his *resumé*, when stating the fact that the average percentage of deaths to strength is amongst the soldiers as 5·62, to 2·11 amongst the officers, he adds in a foot note a rather telling part of the text, that the small mortality among the officers is due to the greater facilities they enjoy of obtaining change of climate when they fall sick.

Leaving Mr. Macpherson with these his cautious hints, we turn again to Dr. Arnott for his enumeration of disease causes. It is fortunate that Dr. Arnott's observations extend over the same period of time as Mr. Macpherson's statistics. Dr. Arnott's information, however, is derived from one regiment; but as this regiment, in all its vicissitudes and perambulations, affords a fair type of other regiments in India, our comparisons from it are again an approximation to the general rule. We will introduce the regiment in the words of its historian.

"Since 1846 the Bombay Fusilier regiment has been in no wise favoured with respect to climate, locality, accommodation, or duty; but, on the contrary, it has been exposed to all the ordinary causes of sickness and loss in no minor degree, including the casualties of war, and the ravages of epidemic disease. It has served within and without the Honourable Company's territories; within and beyond the tropics; and in climes ranging from 13° to 34° of north latitude, and from 44° to 74° of east longitude. It has been stationed on the shores of Arabia, and in Scinde, and in far inland provinces. At places where, for the greater portion of the year, the cool and moist sea breezes prevail; again, at stations on the highlands of the Deccan, 1,800 feet above the level of the sea, where for a similar portion of the year the arid hot winds, surcharged with dust, sweep over its vast bare plains, and where the skin, nails, and nostrils are parched, curled, and dried up. The fusiliers have taken their share in the field of battle, and in the performance of ordinary garrison duty; they have made long marches, and have been again stationary; they have enjoyed a profusion of supplies, and have been limited to commissariat rations. The regiment has had its ranks thinned by the fire of the enemy; it has been exposed to great vicissitudes of temperature, in crowded tents with the thermometer at 114°, and a few months afterwards at freezing point, with snow all around. It has been conveyed from place to place, sometimes in small river steamers, and sometimes in large sea-going vessels. It has been at times located in small, confined, and comfortless pendals, and at others in lofty, capacious, and commodious barracks; and again in pendals which have been described 'a disgrace to the Government of India.' I may add that I have seen sickness prevailing

so little, that for two months the admissions into hospital did not reach 12 per cent. of the strength; and, on the other hand, I have seen, in the same space of time, the admissions into hospital exceed the entire strength of the regiment, at the rate of 120 per cent. With a strength exceeding a thousand men, I have known six consecutive months pass over with only one burial; again, I have witnessed funeral parties consign to their last resting-place forty-eight of their comrades, lost by disease in two consecutive days. I have seen the regiment decimated by disease in nine days, and reduced in the space of a year, from all causes, at the rate of 215 per 1,000, which would have annihilated it in less than five years; and I have seen the annual reduction so low as 47 per 1000,—a rate of decrement which would require twenty years for its absorption. I have known the 'discharged' from the service not exceed one in twelve months, and by the operation of the late order I have seen them amount to twenty-two. But most of these points will be adverted to hereafter in detail. Enough, I think, has been said to show that since 1846 the Fusilier Regiment has escaped few of those influences which are deemed pernicious to the health of the European soldier in a tropical climate; so that, irrespective of the importance of the specific question under consideration, the history of the regiment for that period may be deemed interesting, as exhibiting the changes to which a large body of European troops, performing the ordinary duties required of soldiers in India, and exposed to the various sources of sickness and mortality incident to men thus actively engaged, are liable."

In the course of their changes, during the period of time thus marked out, the regiment underwent the entire metamorphosis of the Irishman's knife. On the 1st of April, 1846, the strength of the regiment, officers excluded, was 791. In the eight years it was joined by 845 new men; and, in the same time, it lost 796, or five more than the original number. Of the lost men, 365 were from deaths, of which only 23 were from battle wounds; 87 were invalided; and 29 were invalided and pensioned. Amongst those invalided, mania and rheumatism hold a high figure as the disposing cause. Forming a general estimate, Dr. Arnott shows that the entire loss of his regiment from all causes was 796, out of an average strength of 957, which is at the rate of about 104 per thousand per annum, and "*equal to the entire absorption of the regiment in nine years and seventh months.*" Some deduction from transfers require to be made in the case of the Company's regiment; but the result is little less startling, when all deductions are included. Three score years and ten may be taken as the life of a man in the world at large; truly so. But your European Indian soldier gives this exception to the rule, that the three score has to be left out when he is mentioned. Such is the extent of human sacrifice to our great Juggernaut.

Now to the reasons of this decrement. We may exclude actual fighting almost entirely, because the numbers lost in a sharp campaign would all be losses superadded to those we have named, or nearly so. What, then, are the reasons? They are included mainly in one sentence—neglect, sheer neglect of sanitary law.

We saw Dr. Arnott, a short time ago, describing in glowing and general terms the favourable contrast which obtains in these days in the sanitary care of the troops, as compared with the days when India was the dead-house of all European soldiers who visited it. Not for the sake of convicting Dr. Arnott of misrepresentation or contradiction (for we know that he is guilty of neither), but for the sake of following an author wedded to the service; and for indicating how wide a breach may occur between the general and the particular, we shall follow him exclusively in showing the true sanitary condition of the European soldier in India in modern times. Every syllable we shall give will be but the condensed and accurate statement of this learned officer.

Barrack accommodation is of vital importance in India; but it is only in one or two of the newest stations that there is such a thing as good barracks. In some cases, ventilation of barracks is carried to such a pitch of refinement, that it is assisted by gutters opening under the wall outside, and near the centre of the floor inside. These gutters are the fitting receptacles of dead rats, and such-like sanitary improvements; and the men at times are overpowered by the putrid frankincense to the mighty firm of cross-bones and skull. Their walls and roofs prevent equalisation of heat, and are specially mischievous in tropical lands; but at Aden, from this cause, no soldier can sleep in his barrack in the hot weather; so, as the sun goes down, he spreads his bed in the open air, and is exposed to the damp—a great, but lesser, evil. In these hovels, during hot weather, the thermometer has stood at 103°; whilst in a common native building, with good walls and roof, it never rose above 95°

In the *out-buildings* connected with Indian barracks cleanliness and drainage are but little cared for. There are many barracks furnished with only one small room in the corner of a narrow verandah; and here are stowed away water casks, in which men are expected to perform their ablutions: "and, incredible as it may appear", says Dr. Arnott, "I have seen iron vessels to receive urine, standing side by side with casks holding the water the men were to drink. Fœtid ammoniacal vapours abounded, which strongly impregnated the drinking water, and formed a reasonable cause of complaint."

In communion with Indian barracks are certain little Edens, called *patchonis*. These are for the lodgement of the married soldier. They are placed on the flank of a range of barracks, and are too often most mean and uncomfortable. To this fact, the high rates of mortality which everywhere prevail amongst the women and children of a barrack are greatly attributable. In some instances, these huts are so ill built, that they evaporate under a monsoon; others are so confined, that a man with children has barely space to move about or lie down. They are so low, that, to heighten them, the floors have to be dug out. The rain which falls from the eaves soaks in on wet days so thoroughly that a mud carpet is the result; there is water everywhere, and in the hot, damp air, the flaccid body of the occupant is lightly steamed. The dry, hot day comes, and the little place is converted into a mild oven, in which the said body is mildly baked. The ladies who are subjected to these enlivening processes, die at the rate of 6 per cent. per annum. The children are removed at the rate of 7 per cent.

There are cells in every European cantonment in India, where the wicked are punished. These cells are never improved, but they are very often occupied, specially by men exhausted by debauchery and the depressing passions. The cell is a hole above ground, with the stereotyped iron gratings and doors, but no verandah; so that when the sun looks in upon the culprit to see how his crimes are disappearing, the place is insufferable, so unutterably fiery. Prisoners and culprits get no sympathy, and measures to ameliorate their miseries are repudiated. This, argues our excellent historian, can scarcely be correct; "for no punishment is supposed to have an injurious effect on a man's health." What does Dr. Arnott say to hanging, then? On one occasion it was necessary to keep a mad-cell prisoner, who was after committing suicide, under the eye of a sentry. The sentry, worse off than the prisoner himself, stood exposed to the direct rays of the sun by day, and to the damp and cold at night.

There are *baths* in Indian cantonments which are so badly constructed, and so small, that, as one infers, a regiment could not march into them in less than a month, although the men went in turns and in the most perfect order. One of these baths, which cost a great deal of money, was so repulsive, that it was only likely to be sought out by some man in the fever of suicide, who would end himself quietly, and without the appearance of anything more than an accident in ablution.

On *shipboard*, the condition of the Indian soldier is a

novelty in its derangements. The crowding and absolute misery of the men exceed belief. In the voyage of the Fusiliers to Aden, the only place in the steamers where the men could spread their bedding was on the top of boxes and gun carriages. They had to occupy the middle part of the vessel, where a constant stream of dirty water or spray and high waves were washing over the decks, and made it impossible there to sleep. Some men had thus not a night's rest on the voyage.

Let the shipboard pass; it is an incident not often repeated, comparatively—we come to a thing of every day life—the dress. Not an attempt here, Dr. Arnott, at condensation; you shall have the inverted commas, and tell the British public (which would be the better for a closer acquaintance with you by the way) your story in full:—

"*Dress.* Next to barrack accommodation, no subject is deserving of more consideration than the dress of the European soldier in India. I have said that it has undergone gradual improvement, and such is generally admitted to be the case; nevertheless, much remains to be done. Improvement is slow, and indeed the pertinacity with which people adhere to old habits is nowhere more remarkable than in the manner of dressing the European soldier in the torrid zone. The soldier in India is belted and clothed like the soldier in Europe, and consequently in a manner calculated to make duty irksome to him, and to be prejudicial to his health and comfort. He must still dress in the cloth coat of a northern climate, in trousers fit for a Siberian campaign, and wear a hat that protects the head from neither heat nor cold. Efficiency is sacrificed to appearance, and soldiers serving in latitudes having a mean annual temperature of 50° above zero, and in countries with a mean annual temperature of 50° above freezing-point (that is of more than double the number of degrees of Fahrenheit above freezing-point) are dressed alike. Surely this is taxing the wonderful capacity of 'man adapting himself to all climates' to too great an extent. Sir C. Napier wished the soldier to be always ready to go into action, and to appear on parade in fighting trim; but he did not consider 'full dress' prepared the soldier best for either. . . . . With the most striking unanimity, all who are able to consult their own feelings adopt a costume calculated as much as possible to moderate the effects of increased temperature; and custom has introduced, and authority has sanctioned, one of comparative comfort. . . . . Common sense, the commonest feelings, nature herself, all point out the necessity of the alteration, whilst dearly bought experience has amply proved that it cannot be neglected with impunity. If, then, it is found after long experience that such a costume is requisite for people pursuing avocations requiring little personal exertions, and which seldom lead to exposure in the open air, how much more necessary

must a similar description of dress be for men loaded with a musket and heavy accoutrements, under a mid-day tropical sun. In the face of experience, however, and opposed to common sense, with the most strange and unaccountable obstinacy, the poor soldier, who has no option, is still doomed in India to be clothed as if he were in Europe. Every one will admit that to preserve the ideas, the views, the associations, the pride, and the appearance of the British soldier must be a paramount object; but that any of these would be lost by adopting a style of dress better suited to this climate may fairly be questioned. . . . The present 'full dress' is not adapted for this country, and the sooner it is altered, or entirely abolished, the better. The stiff hard stock has happily been done away with; and the cumbrous chaco, with its heavy metal ornaments, has been at home, as in this country, almost as universally condemned, so that it is hoped it will soon share the fate of the stock. Lord Hardinge, in his evidence before the Parliamentary Committee on Indian affairs, related that the men of H.M.'s 9th regiment, in the second Affghan campaign, 'marched and fought in their forage caps, through the Khybur Pass to Cabool, and back again from Cabool to India, having carried their European chacos on camels the whole distance up to Cabool and back again at great expense and inconvenience'; and his lordship seemed to adjudge great credit to the gallant regiment for having done so. The zeal and devotion thus evinced were most creditable; but it appears not a little extraordinary that this gallant corps should have been put to such a shift. When the 1st Bombay Fusiliers went on field service in 1848, all the chacos and full dress coats were left behind, and every man marched and fought at Mooltan, and through the Punjaub to Peshawur, and back again to India, in forage caps and shell jackets. Each one would have heartily rejoiced had he been permitted to continue a dress which becomes a well shaped soldier, and in which he knew by experience that he could properly perform every species of duty. But such an indulgence could not be allowed; and the rats, in his absence, having damaged or destroyed the old full dresses and chacos, each man had to reprovide, and incommode himself with these expensive and useless articles. If marching and fighting without chacos be an improvement, as it has been acknowledged, why is such a head-dress not entirely discarded? But even so late as the last Burmese campaign, some European regiments (if we may trust the accounts in the papers) went into action in full dress, and in consequence of such infatuation, these corps lost also as many lives by *coup-de-soleil* as by the fire of the enemy. The helmet which has been proposed—if anything besides the forage cap with white cover is required—will be a great improvement. The red frock coat, which is spoken of at home as a substitute for the present full dress coatee, will also be a great improvement, and if made loose, will allow of the free use of the muscles of the upper extremities, and a free expansion of the chest, which the present coatee does not. It will also, no doubt,

be denuded of many useless ornaments, which add so much to the weight, as well as of the fantastic shoulder appendages, which increase the inconvenience of the present one, and so effectually prevent the soldier, whilst incased in it, from lying down, or attempting to take rest in the recumbent position. That the new pattern, with all its improvements, will answer in this country, seems problematical. The quantity of material and its weight (if made of such cloth as is now in use) will be insuperable objections. Why the cloth trousers are retained as part of the soldier's dress is inexplicable. No soldier can march in them, they are not worn on parade, and indeed they are not worn above six times a year at all, and could well be dispensed with. A cloth of a much cooler and lighter description, such as serge, could easily be procured for use in India both for coats and trousers, and should be substituted."

It is cheering to find, after the account of the dismal facts about barracks, patchonis and dress, that, at all events, the *rations* of the Indian army are good, and that in this respect the recommendations of the medical officers have been so far attended to, that no physiologist could reasonably complain of the diet roll in so far as it relates to *matter*. In respect to manner, however, his complaints might be grievous, especially did the mysteries of Epicurus form part of his studies; for the cooking rooms in barracks are so atrociously constructed, that smoke is always in the ascendant, and eyes are always in conjunction. There is no escape for the smoke, so it blinds the cook, who thereupon spoils the good rations in innocent obscurity. The hospital diet is good. The *water supply* varies; generally it is unlimited and good. At Aden, Dr. Arnott found the men in his regiment allowed a gallon of fresh water and two gallons of brackish water per day, with lime juice and pickles as an antidote, so that the bad water might not give the scurvy. Ingenious certainly. Our author thought this plan too round about, such is the perversion of intellect, and recommended the removal of the pickles and the supply of plenty of pure water. The recommendation was attended to; and the result was, that only two cases of scurvy occurred, and both in men, volunteers, who had suffered from the disease at Aden. Great advantages have accrued to the soldier from the substitution, in some parts, of sound malt liquor for ardent spirits. This substitution has led to a diminution of crime, sickness, and mortality.

In the matter of *occupation* and *amusements* for the soldier in India, especially when he is not out fighting, much remains to be done. The man "has still too much time on his hands, and idleness is the bane of his existence." Tradesmen should be allowed to practise their avocations; and those who know

no trade should be taught one. Healthy games should be instituted, and gardens cultivated. All these and other things require to be done, before the idle Indian soldier is kept *in* health and *out* of mischief.

The invaliding process in the Company's service is conducted on a worse principle than that which obtains in the Royal service. There is no increase of pension for good conduct; and when men are deemed unfit through sickness for active service, they are for ever removed from the strength of the regiment. Many soldiers thus discharged would be glad to return to India, if their health became re-established by a year or two of absence. As it is, they are lost. Still more important in this respect is the question of *furloughs*. European officers and native troops, beautiful sepoys, to whom in these days we are so much indebted, are provided for liberally on this score. But the European soldier has no furlough. There he lives on, in hopeless exile, until invalided or discharged. The act is brutal —there is no other word that expresses it. Dr. Arnott suggests that every soldier, who possesses a certain number of good conduct rings, should be allowed a two years furlough to Europe after ten years service. No other measure would tend so much to reconcile soldiers to their duties, ensure their good conduct, prevent that longing for home which produces, directly and indirectly, such a numerous class of dyspeptic and other complaints, and exalt the character of the service. Whilst at home, they might, from their former good conduct, be very usefully employed in the various military establishments of the Honourable Company, as non-commissioned officers, drill instructors, and the like; indeed, it is strange that the various staff appointments in the home establishment are not conferred upon meritorious Indian soldiers, instead of favourites of no actual experience or merit.

Dr. Arnott, in following out his history of the Fusiliers' adventures, gives a deplorable picture of the position of the troops stationed at Aden in 1854. The place naturally had many advantages; but the barracks and other arrangements at that time were unfit for beasts of the jungle. In a triangular space, bounded by the sea on the east, a nullah on the south, and having a high hill as the base, each side not exceeding four hundred paces in length, were situated pendals for not less than 500 men, as well as the married men's houses, the hospital, the officers' mess room, and some of the bungalows. The position was low and hot. The barracks were of mats, cut so small that there was not space for tables for the men to have their meals at. On two occasions, when the rain came, a

stream broke through one barrack; pools of water stood in others; and next morning, in one of the guard-rooms, the men's cots were floating about in several feet of water. To this low and hot position, and to the faulty condition of the barracks, our author attributes several cases of sun-stroke, which occurred annually, and from which the artillery, which was better placed, had not lost a man.

Having thus sketched out, from Dr. Arnott and Mr. Macpherson's reports, the serious sanitary deficiencies by which the decimation of Indian armies is mainly ensured, we might leave them here, were there not one other fact, which we would gladly omit, but which must in honesty be told.

This last fact is, that venereal affections are among the leading causes of sickness in the European Indian troops. Mr. Macpherson says that, amongst both soldiers and officers, by far the largest amount of sickness arises from four causes: fevers, alimentary diseases, venereal diseases, and wounds and injuries; but, in another place, he shows that of venereal affections there are about 1 per cent. less in the officers than in the men. Dr. Arnott, entering more fully into this question, thus writes:—

"There still remains a class of diseases on which a few observations may be offered. Although only one death during the period under review is placed under diseases of the sexual organs, yet the extent to which the efficiency of a regiment is affected, the number of men constantly attacked, the deterioration of their constitutions, and the consequent increased liability to future disease (as well by the nature of the affection itself, as by the long confinement in a sick ward), the losses to the State by men dying, by their being invalided on account of these complaints, as well as the expense incurred in the medical treatment, give to syphilitic diseases a very important place in the medical economy of a European regiment."

And then, having given a table of cases of this disease, he continues:—

"Irrespective, then, of the deterioration of the constitutions of fifteen men daily, from venereal affections, and of the diseases to which they indirectly give rise, it appears from the return given in a previous part of this report, that upwards of 1½ men are annually invalided on this account, and likewise for the last return that one in the regimental hospital, and three absent from head quarters, died of them. The State has therefore in that period incurred a direct loss of rs. 5,100, supposing each man to be worth rs. 300, or 25 per cent. less than the highest price required to purchase a soldier's discharge from the service. To this must be reckoned the loss of the services of fifteen men daily, the expenses whilst in

hospital, and the charges of sending many away for change of air. When these items are added together, I have no doubt that the cost so incurred if properly and judiciously laid out, would not only prevent much bodily suffering, but prove a great pecuniary saving to the State."

Finally, Dr. Arnott points out that the cause of this great evil, irrespective of the moral question, lies in the fact that the Government discourages marriages, and allows, indeed, but 12 per cent. of married men in each regiment; the which, as we have seen, it treats worse than the wildest of its unmarried scapegraces.

Reviewing the historical facts copied above, a host of grave and serious thoughts rise up in sad and dismal array. Does anyone wish to hear the other side, we will be candid, and will at once refer such one to the handsome sergeant who basks under the court in the busiest street in London, inviting listlessly all young men who near him to be daguerreotyped into the likeness of the glorious dragoon, whose noble presence is depicted on the screen which bedecks the court entrance. Said sergeant being up to his work, will meet us on even terms, and will paint in Eastern symbol the Indian paradise. Good: but till the sergeant is heard, let us speak another word about Juggernaut Britannicus.

It is clear that, irrespective of actual loss in fighting, or nearly so, a European Indian army of 14,000 men is lost to a man in eight or ten years. It is clear, too, that the influences which give rise to this loss, are mainly sanitary, and therefore remediable. But the climate—ah! there's the rub. Well, the climate is bad certainly, not because it is the climate fighting hand to hand with the man, but because the climate exaggerates disease causes, and makes sanitary measures doubly necessary. Are our statesmen asleep, that they look not to their true enemies in the East? We hear of sepoys in arms, and of forces sent out to meet sepoys with rifles and cannon and all the paraphernalia of war. But the choleras and the fevers which are in open mutinies with us, what of them, or of the forces sent out against them? Not a word, save that the men, armed to the teeth against the sepoy, are going against the sun in armour fitted for the pole. But let us compute losses by common sense rule, and see how these sanitary details, which weigh so little in government scales, affect the position of our affairs in India when taken in their vastness. Let us suppose for the moment that at this time and for the year to come not a sepoy should give trouble. Let us say, by an approximate but theoretical figure, that on this day, October 1st,

there are sixty thousand European soldiers on the surface of India. Let us, lastly, calculate by the eight years statistics supplied by Arnott and Macpherson, and we shall find as the result, that at the least, from six to seven thousand men of that army will be inevitably lost from natural causes by October 1st, 1858.

Our friend the sergeant, with the winning smile and the paradise tongue, does not think this loss very considerable, he tells us, all things considered. Perhaps not. But think of India in general mutiny. Think of the sixty thousand under the uncovered sun; think of short commons, and hard muscular fighting; of broken rest and irregular life; and what then? Think of hospital epidemics from pyæmia and erysipelas amongst the wounded, apart from epidemics common; and is not the inference clear that the disease-causes will double, treble, quadruple in their intensities? In a word, should this present mutiny continue till October 1858, which God forbid, the estimated losses from disease may rather be taken at thirty thousand to every sixty thousand, than six, to which will have to be added the losses on the field, when battle after battle, and sortie after sortie, and siege after siege, shall have closed.

We must stop. The subject of argument is such as none can ignore. India, as a British possession, rests now primarily on the sanitary law; secondarily, on the sword. What is the sword without the healthy arm? In a war of years against the natives of India, how long can England send out her two men for one; the one man for her own pestilence Juggernaut, the other man for the chastisement of sepoy scoundrels? This is the great problem; and the sooner the pestilent element of it is considered, the better for us all at home and abroad.

Meanwhile, a final word to the vengeance-men and the sword-proselytes. To the first, this word: When the vengeance fit is on, and the avenging fiend is filling your souls to madness with the idea of rebels slaughtered by the hecatomb; temper the rage, by reflecting how much more noble were an effort, however weak, to rescue your own thousands of brave ones from avoidable death. And to the second, this: When you preach, in the zeal of your house, Down, down with the Indian Juggernaut! preach also, Down, down with the British Juggernaut in India; and expound boldly the nature-written fact, that, in the physical, equally as in the moral world, the laws of the Eternal can never be broken with impunity.

VACCINATION.*

THERE is no element in the human mind more broadly marked than that love for change which, in its influence on general politics, is called the revolutionary tendency. The revolutionary tendency is not, however, confined to politics. In political matters, it is true, we see it in its most exaggerated form; but the idea is everywhere; it pervades science, it pervades history; sometimes it does good, and marks an era in wisdom; sometimes it does evil, and marks an era in folly; sometimes, when it plays its worst and most nonsensical parts, when it violates common sense and opposes fact, it is not without its uses. It sets up a reaction. The friends of order must sustain their cause, even though they be right; they had been lax before; they must be active now. They heap up evidence; they prove, instead of merely asserting, facts; and truth is benefited by the slur that has been cast upon her.

As a memorable instance of the revolutionary tendency in science, few examples of late years have created a greater sensation than the endeavour that has been made to uproot the discovery of Edward Jenner, and to prove that vaccination, instead of being a generally recognised blessing, should rather be received as a curse on humanity, and a disgrace to science. In the early days of vaccination, the points connected with its utility, or its evils, were discussed in what are called general terms. Individual men spoke according to their individual experience; and, taking it all in all, this individual experience stood out in favour of vaccination. In the face of prejudices, too, the people recognised its truth; for its great facts were self-evident, without any measurement or scientific symbol. Fifty years ago, let a man stand in a market, in a theatre, in any crowded assembly, and one out of every two or three of his neighbours bore on their faces the deep brand of the great epidemic. Jenner came, and the face of human nature changed. Year by year the pock-marked community died out, and their places were filled by less blemished physiognomies; and this has gone on until, in these days, the small-pox impression is well nigh out of print, and is no more called for again than the library of trash that has been written against vaccination.

A sort of simple common sense demonstration is certainly

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* Conclusions Statistiques contre les détracteurs de la vaccine, précédés d'un essai sur la méthode statistique appliquée à l'étude de l'homme. Par le Dr. BERTILLON. Paris: Victor Masson.

Papers relating to the History and Practice of Vaccination (Letter to the President of the Board of Health). By JOHN SIMON, F.R.S. London: 1857.

written in this single physiognomy-improvement fact; a demonstration which every body could see and appreciate: add to which every body (a few blockheads excepted, only to support the rule) felt, that when small-pox was at their doors, it was good to be vaccinated, and found that it *was* good because after it they did not die or suffer. So these and many other things combined, gave to vaccination a general recognition, and to Jenner an universal claim to distinction in biographical history.

Whether it be the fact that things generally believed in are not safe as beliefs until they become mathematically demonstrable, it is not necessary to discuss; but, as regards the vaccination question, it is to be noted that, when general assent had been accorded to it, it became subject to dissent by another line of argument, the statistical line, so called to distinguish it from the *fides populi*.

The statistical argument once brought into play against vaccination, discoveries began to rise like rockets, and fall like the sticks. Jenner's discovery, it is true, was never seriously shaken; but it had to be proved by the very arguments which were now used against it. Once assailed on mathematical principles, it must needs be defended on the same principles, or it must lose ground. To its defence in this line, the distinguished Bertillon put forth his best energies; and, in the book we now review, he chronicles some of his labours,

Anxious in the commencement of his work that his readers may understand him, Bertillon explains his ideas of the meaning of the statistical method of inquiry. On this subject there is great want of unanimity and soundness. Bertillon's explanations run, in brief, as follow.

The phenomena of nature are so complex, that without analysis they may always escape science; man living in a state of incessant contemplation before the magnificent unity of creation, would wear out sensation without arriving at knowledge. But analysis, in temporarily isolating an object, in concentrating on the object the attention dispersed on all, in permitting it to be submitted to all the proofs of which it is susceptible, enables one to study the object, and, through this study, to arrive at positive science.

The first method of analysis which naturally presented itself, was to consider each object separately, to submit it to the senses under all its states, and thus to study each property. This method has always sufficed when the extent of the object of study, as well as the intensity of its action, has been sufficient to affect the senses forcibly. Thus the first requirements

were satisfied. But man soon met with a limit to his work through the imperfections of his organs. Things which escaped the naked eye, betrayed their existence in their effects; and the microscope came forward to render its wonderful services. Things which, out of the domain of optics, escaped observation, and which related to wide spread influences on man, geological, geographical, social, sexual, required also an instrument for their deeper analysis; the instrument was found in the science of great numbers, its name Statistics.

Having thus explained his views as to the meaning of statistical science, and dwelt at some length in the way of illustration, M. Bertillon exposes the opinions of those who are opposed to vaccination, and deals throughout in many hard blows against M. Carnot, a man who seems to have been fatally bitten by an antivaccination mania. In this battle, Bertillon is ably supported by Simon; and, as many of our readers may not know who M. Carnot is, or what his heresy, we may be excused for following our authors' narratives. Carnot was originally an artillery officer, and is described by Simon as having more zeal than judgment. He, Carnot, believes that he has discovered what he calls a displacement of mortality, and that, within the present century, deaths which used to occur in early infancy, now occur between the ages of fifteen and thirty. He alleges (we are quoting Mr. Simon *verbatim*) that the female death rate in Paris, for the ages of fifteen to twenty-five, has doubled in the last thirty-eight years; that the annual mortality of the French army on home service was 2 per cent. during the period of 1819-47, but had been only one per cent. before the Revolution of 1789; that of male and female deaths in Paris, at ages above fifteen, only 35 per cent. used to happen between the ages of fifteen and forty-five, and that now 50 per cent. are in this category; that the chances of an infant reaching forty-one years of age, are the same now as they were in the last century; that the death lists of Paris for 1840-9, compared with those of fifty years previously, show some diseases (typhus, cholera, dysentery, and colic) to have increased almost as much as others (small-pox, measles, convulsions, and croup) have declined; that the annual marriages in France exceed by twice as many as they forty years ago exceeded the marrying proportion ($\frac{1}{79}$) of females who annually (on Duvellard's estimate) reach the connubial time of life, and that this increase denotes a doubled annual number of second marriages, or, in other words, a doubled annual quantity of early widowhood; that, with a greatly increased number of marriages in France, there is a diminished number of births; that the births

are rapidly tending to become less numerous than the deaths; that the depopulation of France is in imminent danger, which must begin to realise itself within the next few years; that gastro-intestinal disease—especially typhoid fever—is the agent of this destruction; and finally, that the cause of this complicated derangement is the practice of vaccination.

So much for M. Carnot. Mr. Simon thus summarily disposes of his labours. "Now first let the concluding word of the summary be criticised. M. Carnot's statistics allege a difference in adult vitality between the France of to-day and the France of the last century. Supposing the statistics to be correct, does he give any sufficient reason for ascribing to vaccination that deteriorated state of adult life which he professes to have discovered? So little does he this, that in any of the sentences where damnatory conclusions are drawn, if there were substituted at hazard, for his word, *vaccination*, the mention of any other historical event, belonging to about the same period of time as Jenner's discovery, M. Carnot's logic would scarcely suffer by the change, or his new conclusion be less warrantable than his first. *Post ergo propter* was never more whimsically illustrated. For the argument goes simply to claim as the effect of vaccination, whatever evils have happened since its discovery; and M. Carnot's moderation may be praised, that with the infinite resources of his proof, he did not also convict Jenner of causing the last year's inundations of the Rhone."

This quotation, if it did not in its last sentences flavour feebly of M. Carnot's own logic, might be considered as a scientific shutter-up of no mean force.

Bertillon, on his side, enters more fully into detail in opposition to the redoubtable Carnot. We think it useless to follow him in all his arguments. One or two examples will suffice to indicate on what false, dangerous, and ridiculous data Carnot's statistics are founded.

Bertillon shows that the statistics of Paris, on which Carnot bases his conclusions, are not reliable as data for any such assumption. Take, for example, the statistics derivable from the census of 1851. Here there are three leading errors. 1. Great numbers of newly born children are omitted. 2. There is a surcharge in the numbers of persons living at the ages of thirty, forty, forty-five, and fifty, to the detriment of the intermediate ages. 3. The age of twenty years has evidently been made the basis of a deception, executed without doubt in the hope of escaping conscription.

Again, Carnot has drawn his views from statistics referring

to women only; in order, so runs his sophistical explanation, that the deductions may be independent of any modifications in the male sex, arising from wars and other serious accidents. Bertillon asks, with pertinacious reason, whether M. Carnot does not also think that the unfavourable conditions under which women are placed in large towns, weigh much more heavily on them than on men?

Once more, Bertillon argues, with common sense force, that the comparison of mortuary tables is not enough in itself to lead to a true appreciation of the mortality of each age. For example, in one thousand deaths of all ages, during the past century, we learn from Montyon or Duvillard, that there were about thirty-one deaths between the ages of twenty and thirty years; while in our time, M. Heuschling has found seventy-five.

Might it not, therefore, be concluded from this fact, according to the ordinary method pursued by the opponents of vaccination, that adults succumb in much larger numbers in these days, than they did heretofore? This would be to commit a gross error, since the increased mortality of adults may be distinctly traced to the circumstance that there are now living a greater number of adults, so that the proportions are the same; while, apart from this consideration, granting that the sum total of the living of each age remained stationary, we should not be authorised to conclude that adults succumb in greater numbers, because, out of a thousand deaths at all ages, we now find seventy-five deaths between twenty and thirty years, in the place of sixty-one deaths, as in times gone by. For, if the mortality of the other ages has diminished—and we know for a fact that the mortality of infancy has most notably decreased, while that from twenty to thirty years of age has remained stationary—it will result that, in the same number of deaths, there will be found a greater number between twenty and thirty years, since the deaths of the other ages will have lessened.

We need not follow out this opposition further. Our English statists have long since seen and felt the danger of incorrect deduction from statistics. An unscrupulous man may use them for any purpose. A scrupulous man uses them with fear and trembling. The study of statistics is as inductive in its purest phase as experiment; but it is also as dangerous, in that it may be raised into the grossest empiricism. Statists, of all men, should look before they leap. Suffice it to say now, that Carnot and his followers have broken down entirely; and that, if statistics prove nothing as yet, on safe grounds, in favour of vaccination, they most assuredly bring no charge whatever against

it. Jenner's foot is on the statist's throat. What statistics really say on the question is very skilfully summed up by Mr. Simon.

"So far, then, as these populations" (the populations of Sweden, Denmark, and London) "are concerned, it appears that while under the influence of vaccination small-pox has been diminishing its ravages, so under other influences have other diseases been diminishing theirs. Under other influences, I say; for the causes of fever, the causes of cholera, the causes of consumption, are several and special causes. Each disease is affected for better or for worse by influences proper to itself; and the prevention of small-pox no more implies the prevention of fever, than to sow barley implies the reaping of wheat. But what has to be noticed (so far as these materials inform us) is, that annihilation of small-pox may be tried for as an unequalled physical good; that hitherto there is no trace of evidence that other diseases become more malignant in proportion as that one is subdued."

Having dealt with the statistical part of the question thus far, Mr. Simon fell back, in his defence of vaccination, on the argument of individual experience. He drew out a series of questions, which were sent for answer to numbers of eminent practitioners of medicine, to foreign governments, and the like. The questions ran as follow.

"1. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of small-pox, and almost absolute security against death by that disease?

"2. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of small-pox, become more susceptible of any other infective disease or of phthisis, or that their health is in any other way disadvantageously affected?

"3. Have you any reason to believe or suspect (*a*) that lymph from a true Jennerian vesicle has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; or (*b*) that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?

"4. Do you (assuming the provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?"

The objections that may be urged against these questions by the opponents of vaccination, are, that the questions are leading ones, and are sure to elicit the required answers. We ourselves think that the results obtained would have been sounder if the method of questioning had been reversed; *i. e.* if the questioner had presumed for the moment that vaccination had

its evils, and had asked his answerers how often they had seen such and such results. Nevertheless, there is no disputing the importance of the replies, or the fact that 539 medical men, all of eminence, have joined heart and voice in giving a favourable answer to the first three questions, and in supporting in full the discovery of Jenner as a protective, and its innocence as a practice.

Amongst some enthusiasts, the idea is prevalent that, by a perfect system of vaccination, small-pox might be entirely removed from the world. Is this extreme? The evidence collected by Mr. Simon is most interesting in reference to this topic. We would that we had the space to quote largely on this point from the extended replies met with in this report. We must be satisfied to pick out one representative fact. An extract from an explanatory paper accompanying the official answers from Denmark gives the following decisive particulars.

"Of the great epidemics of small-pox in Denmark, history mentions that of 1502, of 1556, that of 1716, and perhaps several others; but we search in vain for statistical returns exhibiting the number of individuals cut off by these epidemics. The disease raged year by year in the towns, as well as in the country; and although it attained a frightful height every fourth and seventh year, attended with typhoid fever, scarlet fever, and especially measles, yet our annalists did not feel themselves called upon to make any returns of an occurrence so common as this: the merits of the science of statistics, as applied to sanitary purposes, were at that time too little appreciated. In the face of such melancholy considerations, it is satisfactory to be able to report that this disease, since the universal introduction of vaccination (1810), has not only lost its worst sting, but that the disease has not shewn itself in Denmark for more than fifty years. The reporter states that the annals of Iceland give the history of the epidemic of small-pox occurring in that country from the year 1241 to the year of the great epidemic in 1707: it is said to have been brought into the country by some wearing apparel belonging to an Icelandic student, who fled from Copenhagen for fear of the small-pox, took that disease on board the vessel, died, and was buried in Norway. Of the then population of Iceland, somewhat exceeding 50,000, this disease carried off, according to reports, 18,000. In that country, where the parishes are so thinly populated, there were tombs in the churchyards in which thirty, thirty-four, to forty individuals were interred in one day. It was no unusual occurrence for persons having once gone through the disease, and bearing the marks upon them, to be attacked again and die. In 1785-86, and 1787, 1,425 died; this was the last time the disease occurred in that island during the last century.

"Since the introduction of vaccination, small-pox has only once

occurred in Iceland, viz. in 1839, when it was brought to the northern division of the island. It was very mild, and was prevented from spreading to the southern division by measures of isolation. Several individuals were seized with the disease, who had it in 1785. Of the population of the town of Reikavick and its environs, amounting to from 1,200 to 1,300, of whom the greater part were vaccinated, only fifteen died. At a fishing cove, however, where only a few had been vaccinated, forty died out of a population of about 600. The disease continued to prevail in 1840. The population of Iceland, which in the twelfth and thirteenth centuries is said to have been 120,000, was 46,201 in 1769, and 57,094 in 1840."

The common as well as the statistical sense of mankind stamps these details with the seal of truth. Wherever vaccination is faithfully and scientifically practised it has prospered, we had almost said without an exception. Yet one exception is claimed even by its friends. Mr. Brown of Nepaul, who gives a most interesting account of the origin and success of vaccination in that Indian province, tells us, that inoculation is best suited for the inhabitants of Bengal, and that probably vaccination is too weak to act as a prophylactic in such individuals. Mr. Simon should seek an explanation of this statement. Is it based on fact and rigid experiment?

The study of the works here introduced to our readers opens up a number of important social, as well as scientific, questions. It is clear as crystal that vaccination is the preventive of small-pox, and that whole countries are saved from the scourge by its influence. But England, the birthplace of vaccination, is perhaps the least saved of all. We take up the Registrar-General's returns, and, during a period extending from 1838 to 1848, we find 462,227 deaths recorded as from these seven epidemical diseases, taken in order according to their fatality;—typhus, scarlet fever, measles, hooping cough, small-pox, influenza, and erysipelas. Small-pox, it is true, is fifth on the list; but it numbers out of the total of deaths 59,460 victims. The fact of such a sacrifice, in the presence of an antidote, is something in horror, that exceeds belief.

Why this sacrifice? facts against vaccination? No. Loose law in regard to the practice of it? No. What, then? Ignorance, prejudice, and the use of force for reason: the last most. Law and compulsion, in fact, are forces that will bring vaccination into entire disrepute in these islands. Law and compulsion are only serviceable to the Englishman when he knows, or thinks, or feels, that the law is right, and is for his protection. If you cannot convince him through his reason

that a law is right, you will never beat it into him through his fear. On the contrary, the more you threaten, bully, and coerce, the more thoroughly will you satisfy him as to the correctness of his own views, and prevent him from inquiry altogether. What can be done with such an obstinate? does some one ask. Anything that is reasonable, is the reply. But drop the whip. An English community, that would not move for a shower of government commands, will move at once to a few sensible cadences rung on the alphabet. The point, therefore, is to instruct, prove, convince. What sensible man, poor or rich, cares to act without a clear view to utility?

We are advised by the preface to Mr. Simon's questions, that the late President of the Board of Health intended to bring in a new vaccination measure, or obtain a commission of inquiry; and as for that object the present Report was drawn up, there is a great deal in the intent to be thankful for. If, indeed, improvement in the system of vaccination be intended in the object, the intent is mainly carried out in the book here supplied. Let the Government of this country take but one other step. Let them have this report of Mr. Simon carefully and pleasantly condensed; let its facts be made easy, and its arguments simple; let it thus be (we must forge a word) primerified and then sown broadcast over the whole country, through the clergy and the Esculapian professors, so that every stupid may read or hear read what is the end and meaning of vaccination, and more will be done for vaccination than by a thousand acts or a million fines. As it is not probable that even the most common people enjoy small-pox, or have any other wish than to see the last of it, it is but logical that they would not have it, if they felt sure they could avoid it without risk. Make them sure, then; this is the political card.

Reviewing this question, indeed, from the true practical point, viz. a knowledge of the poorer classes, and the objections made to vaccination by them, we are prepared to say that it is not with the very ignorant that the objections originate, but amongst those who are most acute, who rank among their fellows as superior in argument, who read a little, think much, and possess special independency of will. These men (they are to be found bespread through every village and town community) have their reasons against vaccination, as fully as we have ours for it. Their reasons are false, but they are reasons; and, to their untutored observation, the reasons are all powerful. Their great argument is not against vaccination as a preventive of small-pox (at all events, not as a general rule), but against it as the propagator of other diseases. Nay, we wrong the

poor in presuming that they are the only objectors on this score; for, whatever the facts may be, there is in the human mind some feeling so instinctively strong against the possible intermixture of health and disease, that we doubt whether the firmest advocate of vaccination would let his healthy babe be vaccinated from a sickly one, or would allow an operator to do his work from an unknown source, without inquiring first, and anxiously, whence the ivory point received its virus. Is this instinctive feeling wrong? Argument says yes; but experience finds it to be as strong as it is wrong; and, until this feeling can be appeased by fact and sound argument, and met by some plan that shall yield assurance of a healthy virus for every infant, the prejudice will be national, and all law ceremony null and void. Law-making becomes idiotcy when nature leads the opposition.

We cannot conclude, without expressing our deep thanks to Mr. Simon for his most laboured and invaluable report. By it the Board of Health has positively merited its twelve months reprieve from death; and next year it may, if it likes, renew its lease on the same terms. If it would not violate the principles of circumlocution too much, it would be useful to beg that a blue book might, for once, go through a second edition. In such second edition, the basis of the work might be widened. The experience of all the medical men in the United Kingdom, of all the medical officers of the services in all parts of the world, of all the great hospitals of the world, and of all the leading practitioners of all the great towns in the world, might be sought, obtained, and chronicled. The individual method of proof would thus by its vastness compete with the statistical; and, as the defence and support of vaccination rests naturally with England, this great work, the plan of which is already designed and in part carried out, remains in her hands for completion.

MEDICAL GEOGRAPHY AND ENDEMIC DISEASES.*

A SCIENCE is called exact when all its details can be referred to first principles, and when, starting from first principles, we are able to educe their necessary consequences in detail. Thus, in mathematics, we arrive at the knowledge of unknown things by accurate reasoning on certain known axioms. Every line starts from a point. Every series begins with a fixed number. With this idea the Pythagoreans endeavoured to translate the law of nature into the law of numbers. Statisticians are doing the same thing. The progress of science has been from the simple to the complex: from mathematics to physics, from physics to astronomy and chemistry, from these to meteorology, and to the foundation of physiology and pathology. Thus, of all human studies, there is nothing more comprehensive or more elaborate than that which treats of the phenomena of living beings; and as man is of living beings the archetype, the highest known living organisation, so is that problem the most difficult to solve which seeks to render an account of the relation he bears to the external world, to explain how he acts, and how he is acted upon. From time immemorial the inquisitive nature of man has sought to unravel the mystery of his physical being. The biblical word and proper name *Adam* stands for *earth, blood, man.* It has been left to modern science in the hands of a Liebig to show by chemical demonstration how these are mutually convertible. Hippocrates explained life by regarding it as a product of nature; and there has been no lack of ingenuity in the invention of fictitious principles which were to afford the key to the solution of vital actions. The ancients and moderns have vied with each other in their haste to render premature solutions of the hidden springs of nature. We have had the *pneuma* of Athenæus, the *arche* of Paracelsus and Van Helmont, and the *soul* of Stahl. The material system of Leucippus and Democritus has been revived by modern materialists, and life has been explained as a *property* of matter. Electricity, caloric, fermentation and mechanical equilibrium have each in turn been held up by their respective admirers as the efficient causes of all

* Traité de Géographie et de Statistique Médicales et des Maladies Endemiques, comprenant la météorologie et la géologie médicales, les lois statistiques de la population et de la mortalité, la distribution géographique des maladies, et la pathologie comparée des races humaines. Par J. Ch. M. BOUDIN, Médecin-en-Chef de l'Hôpital Militaire du Roule; Officier de la Légion d'Honneur. Avec neuf cartes et tableaux. Tomes ii, 8vo. Baillière, Regent Street.

vital phenomena. Bacon, with his "non fingo hypotheses", started a new era. Philosophers no longer were to be allowed to amuse themselves with inventing inexplicable theories to explain inexplicable things. There was the book of nature laid open before them. There was the "Mene, Mene, Tekel Upharsin" for those who had the wish to interpret. An age of physical inquiry and registration of facts was inaugurated. When these had been recorded by numerous observers, it was found that their isolation was an embarrassment, and men sought to tie them together. Newton suggested *gravitation* as a bond of common union among a certain class of facts; and this also was a fact which was found to be a general law applicable to the heavens as well as to the earth. But Newton never set up gravitation of itself as a cause of any phenomena. The solution of its essential nature he never sought to unravel.

The system of experimental inquiry in physics led to the adoption of the same method in the pursuit of other natural sciences; and Cuvier showed, by his observations on general anatomy, how to distinguish, by a small bone of the foot, the peculiar characteristics of the animal to which it belonged. In his history of the progress of natural sciences, he observes, "that in the period between 1789 and 1808 natural history began to be recognised in its true character—namely, a science the object of which is to apply the general laws of mechanics, physics and chemistry, to the explanation of the particular phenomena presented by various bodies in nature."* It may be said that the philosophic inquirer into the origin of disease is now bending all his efforts to trace the connection which exists between diseases and their source, whether these proceed from within or without. The causes of all diseases must be sought either in the innate constitution of our bodies, or in the external action of the agents by which we are surrounded. It follows then, that by an accurate examination of the peculiar effects produced by climatic relations, we may be able to assign to temperature, to atmosphere, to humidity, to locality, and to other physical agencies, their individual and specific actions. When the observation of facts shall be sufficiently extensive, let us hope that another Newton may come on the stage to solve the problem of generalisation of the laws of life, but let us avoid narrow contracted views. Hasty hypotheses and generalisations have been the bane of science.

In the meantime, all experience and knowledge may be made immediately applicable for the alleviation of disease, and for

* Cuvier, Histoire des progrès des Sciences Naturelles.

preventing such catastrophes as those which attended the French expedition to St. Domingo in the beginning of the present century, the Walcheren invasion during the epidemic season in 1809, and the advance into Russia by the French in 1812. A knowledge of medical geography would have taken cognisance of yellow fever, of marsh fever, and of the effects of congelation. We have taken these instances from the book we have in review; and the errors which have prevailed with regard to acclimatisation, as well as the importance of the subject, are thus referred to by the author, who says, in the Introduction:—

"It is the question of acclimatisation which must rule the selection of colonies, and the choice of troops destined to serve in countries more or less distant from the mother country. But the strangest errors have prevailed on the subject of acclimatisation, the inconveniences of which have sometimes been exaggerated and sometimes extenuated. Cassini thought no animal could live above 4,767 *mètres** above the level of the sea, whilst observation has taught us that men inhabit regions close upon 4,800 *mètres* of the same measure of altitude. Aeronauts have ascended upwards of 7,000 *mètres*. According to Boerhaave, no animal provided with lungs is able to live in an atmosphere the temperature of which equals that of its own blood, whilst the indigenous inhabitant of certain countries of the globe enjoys perfect health with the thermometer (cent.) at 47°† in the shade and 70°‡ in the sun. On the other hand, a celebrated geographer, Malte Brun, affirms that 'under every climate, the nerves, the muscles and the vessels, in dilating or contracting, soon take upon themselves the habitual condition which is most suitable to the degree of heat or of cold to which the body is exposed.'" (p. xxxvii.)

Dr. Boudin is of opinion that to a certain degree the human race is capable of adapting itself to any climate, but he is not a believer in the power of acclimatisation being without limits. He questions whether the negro is capable of preserving his integrity of intellectual and physical organisation, and of perpetuating his race without the tropics. He also gives a table showing the gradual extinction of race which is taking place among the negroes in the British West Indies, and a tabular view of an official report of the relation which exists between the births and the deaths, in which the latter are in excess. He quotes a remarkable report of Col. Tulloch, who says: "That before a century has elapsed, the negro race will

* The mètre is equal to 39·37 English inches.

† 116⅖° F. (47° C × $\frac{9}{5}$ = 84⅖ + 32 = 116⅖° F.)

‡ 158° F. (70° C × $\frac{9}{5}$ = 126 + 32 = 158° F.)

almost have disappeared from the British colonies in the West Indies."

In respect of the power of the European constitution to adapt itself to a hot climate much misapprehension has prevailed.

"For a long time many governments, somewhat in accordance with medical theories, hoped, by a protracted residence in hot climates, that the European garrisons would diminish their ratio of mortality; but the practical application of this theory was followed by the most disastrous results. On the other hand, the system of a triennial renewal of these garrisons, adopted by the English government, already shows, by statistical returns, how prudent and how beneficial to the health of the troops this change of system has been." (vol. i, p. 40.)

The proportionate ratio of mortality which exists between the English and the native troops in India is a subject of great importance :—

"During the period from 1825 to 1844 the mean annual mortality of India has been, in the province of Bombay, 50 per 1000 men for the English troops, and 12 only for indigenous troops. In Bengal, 73 for British troops; 17 for the natrive troops. In Madras, 38 for the British; and 20 for the native troops. In Sierra Leone, the annual mortality, which in British troops amounts to 483 deaths to 1000 men, is reduced to 30 per 1000 among the negro troops. But the most curious and interesting observation is, perhaps, that which has been made during a series of years in the island of Ceylon, where the comparative ratio of mortality has been noted among five different races of which the troops are composed. Thus—

	Ann. Deaths per 1000.
Native troops of Bengal and Madras	12
Troops recruited on the coast of Ceylon	23
Malays	24
Negro troops	50
English troops	69

Thus race and nationality show themselves of the highest importance in the consideration of recruiting for foreign stations; not alone as an object of humanity, but of the highest consequence in political and financial economy." (*Ibid.*)

The high rate of mortality which is thus shown to exist in British troops in India, in proportion to that which prevails amongst the native troops, being nearly quadruple, must present itself as a subject of the greatest importance at the present juncture of Indian affairs. With such an experience before us, it will scarcely be deemed practicable to hold India by the continued presence of large bodies of British troops, among whom a natural process of extinction is continually going on. Without doubt the present mutiny will be sup-

pressed by the energy and vigour of European material organisation, discipline and courage; but a policy which will make the native feel that it is his best interest to serve us is the only one that can ever preserve India as the subject of Great Britain.

A table is given by the author, in which will be shown the increasing depopulation which exists among European colonists in Egypt and in other parts of Africa.

"According to reports presented by the French Minister of War, the mortality of the French population, which in France is about 24 deaths in 1000, and during the cholera of 1849 never attained to 28 in 1000, ascends in Algiers to the following figures:

	Deaths to 1000 Inhabitants.
In 1848 to more than	41
1849	101
1850	70
1851	64
1852	55
1853	47

"In 1854, that is, during the last year in which government had published its report, the number of deaths of the European population to the number of births were as 7025 is to 611." (p. 38.)

The following passage, which alludes to the power of acclimatisation with which certain races are endowed, is worthy of quotation:

"There are types of races which have a wonderful power of adaptation to the changes of climate, while others are scarce able to support the least change. Among the former, we may cite the Jew and the Gypsy. The Jew at the present moment is to be found in every part of the world: in Europe, from Norway to Gibraltar; in Africa, from Algiers to the Cape of Good Hope; in Asia, from Cochin to the Caucasus; from Jaffa to Pekin; in America, he is to be met with from Montevideo to Quebec; for the last fifty years he has invaded Australia; and has given proofs of his power of acclimatisation under the tropics where people of European origin have constantly failed to perpetuate themselves. In relation to altitude, although he seldom inhabits the mountains, for his tendencies are usually industrial or commercial, yet there is nothing to make us suppose that he possesses any physical incompatibility for residence in elevated localities. On the other hand, he has lived for many ages, and lives on still on the only point of the globe, the valley of the Jordan, which is situated more than 400 *mètres below* the level of the sea, and where it is doubtful whether any European would ever suceeed in propagating his race. Finally, wherever the Jewish race has been studied up to the present time, it has been found to submit to statistical laws of births, deaths, and proportions of sex, differing completely from those which govern the nationalities among whom they reside. Assur-

edly, so unexpected a fact, one so contrary to reasoning, is not one of the least interesting of the facts which medical geography has demonstrated to us."

Speaking of diseases in a geographical and historical point of view, the author says :—

"The diseases of humanity have differed according to time and space. History describes to us diseases of former times unknown at the present, and scourges unknown to ancient times devastate modern populations. Thus Pliny the naturalist observed nearly eighteen centuries ago: 'Id ipsum mirabile videtur, alios in nobis morbos desinere, alios durare"; and fourteen centuries later Sydenham has it: 'Sicuti alii morbi jam olim exstitere qui vel jam ceciderunt penitus, vel ætate saltem pene confecti exolevere, et rarissimi comparent; ita qui nunc regnant morbi, aliquando demum intercident, novis cedentes speciebus, de quibus nos ne minimum quidem hariolari valemus.' When account is taken of the absence of sporadic cases of plague in the East during the last fourteen years, and of its gradual diminution for the last two centuries, it appears more than probable that this disease is becoming gradually extinct." (p. 41.)

There can be little doubt but that the type of disease must have much changed even in our own times in England. It must be within the memory of most practitioners how much the use of the lancet has fallen off, as well as the employment of depletory medicines. Mercury, tartar emetic, and opium, formed the tripod on which every practical man took his stand. The antiphlogistic diet was in vogue. Disease was regarded as a raging fire, which was to be extinguished by all means, and at all hazards. Sometimes the patient succumbed, and sometimes recovered. Of one thing we may be quite sure, that if the same system of antiphlogistic treatment were adopted at the present time, such heroic treatment, as it was called (facetiously perhaps), would be uniformly fatal. Are we to say then that our forefathers were less skilful or less observant than ourselves? Certainly not. But we must conclude, what history teaches us, that the type of disease has changed, and what might have been a proper treatment fifty years ago, would be a very dangerous one now. *Tempora mutantur.* The drunken *bonhommie*, which prevailed in the good time when George was king, might be a very jolly life for the robust bacchanals of those days, who were able to enjoy themselves without much deterioration either of their mental or their physical vigour. It is not unreasonable to imagine that depletion was the best thing for constitutions capable of such rough usage.

We pass on more particularly to a notice of the author's remarks on Medical Geography. He observes:

"In regard to the distribution of diseases according to space, it belongs to the province of medical geography; and its study is of the highest interest, even in the most practical point of view. It may be sufficient for the medical man whose practice is circumscribed within a definite locality, to know the particular topographical nature of its diseases; but it is not so with the physician who resides in a centre, having constant relations with all parts of the world, and even less so with the medical officers of the army and navy, who are constantly required to change their residence. For these latter, it is their duty to be conversant with the diseases of all parts of the globe to which they may be destined, for upon this knowledge the success of an expedition or the safety of an army may depend.

"Like plants, some of which are disseminated and found in every part of the globe, whilst others are, as it were, endemically circumscribed to certain defined localities, so the diseases of the human family, some of them are universally distributed over the surface of the earth, while others are found restricted to certain zones and localities. Like plants, diseases have their *habitats*, their *stations*, their geographical limits. The northern limit of the cholera in Europe is found to be Archangel, about 64° north latitude. It has as yet spared from its attacks Iceland, Greenland, and Siberia; in America it has ascended up to Canada, and it has attained its southern boundary in 21° south latitude. The Cape of Good Hope and Australia have as yet escaped this scourge.

"The limit of 'marsh fevers' in the old continent may be represented by the isothermal curve of 15° centig. The north of Scotland, the Hebrides, Orcades, Shetland, Faroe Islands, and Iceland thus escape. In the southern hemisphere, the domain of marsh fever does not even reach the isothermal line of 15° centig. Yellow fever has never passed the 48° of north latitude, nor the 27° of southern latitude. Its home is represented by the shores of the Gulf of Mexico and of the Caribbean Sea (*la mer des Antilles*) and along the American coast of the Pacific Ocean. Pellagra is to be found between 42° and 46° north latitude. The 'tubercle of Aleppo' (*le bouton d'Alep*) between 33° and 38°; the bereberi, between 16° and 20° north.

"In respect of geographical longitude, similar limitations prevail. Thus in the Scandinavian peninsula, the *radesyge** is to be found eastward, and the *spedalskhed* to the westward of the mountains. A disease, *verugas*,† is restricted to the western declivity of the Andes in Peru. Yellow fever has only been observed between Livorno and Acapulco. The plague has its eastern limitation in a

* A cutaneous affection.

† This is also a tubercular cutaneous disease, analogous to the elephantiasis of the Greeks. *Spedalsk*=a leper.

line drawn from the Gulf of Mexico and extending to the Caspian Sea." (p. 42.)

The degree of elevation exerts its specific action on the character of disease. Thus the author observes:—

"Verugas is only found between 600 and 1,600 *mètres* above the level of the sea. In Mexico, the yellow fever never ascends higher than 924 *mètres*. Cretinism, which in South America is to be observed above 4,000 *mètres* of elevation, in Piedmont never rises higher than 2,000 *mètres*, and in Switzerland not higher than 1,000 *metres*. Of 10,000 inhabitants of Piedmont, there are found 35 cretins in the mountains, and only four in the plains; 100 suffer from goître in the mountains, and 16 only in the plains. Sometimes the influence of elevation is represented by a simple modification of the form of disease. For instance, marsh fever, as it recedes from the equator or from the summer season, loses its type of continuity, and becomes more and more intermittent; and so also in hot and marshy countries, in proportion to elevation, do these fevers pass gradually from continued to the rarest intermittents, thus representing in effect a perfect stratification and graduation of types. There are diseases strictly local, confined within circumscribed limits: thus *verugas*, in Peru; *pinta*, in Mexico; *caak*, in Nubia; *plica*, in Poland; *tubercle of Zibau* (*bouton de Zibau*), in Algiers; hydatids of the liver, in Iceland. Other affections, although not strictly localised, yet present themselves with an exceptional frequency: such are tænia, in Abyssinia; cataract, in the Bay of Biaffra; croup, in certain parts of Sweden; the trismus of new-born babes, in the island of Westmannö; pemphigus, in Ireland; and *bicho*, in Brazil.

"Some countries are remarkable for the rarity or absence of certain diseases: thus pellagra is wanting in Sicily and Sardinia; gout is scarcely known in Peru, in Brazil, or in Nubia; phthisis, very rare in the archipelago of Viti, is almost unknown in Iceland, in the Faroe islands, and in the steppes of the Kirghis; vesical calculi are rare in Pisa, Madrid, and Guiana; hæmorrhoids are never observed in Nubia; scrofula, rare in the Faroe islands and in the steppes of the Kirghis, is completely absent from Iceland. Obesity is very rare in North America.

"The nature of the soil seems in many cases to have an immediate connexion with the character of prevalent diseases. Cholera is found to have a marked predilection for a tertiary and a clayey soil; goître is to be found specially on a soil of chalk metamorphosed by magnesia, while adjoining granite and oolithic districts are exempt.

"Such is the intimate connexion (*solidarité*) between the soil and certain diseases, that modification of the former is followed by a corresponding change in pathological demonstration. On many points of the United States and of Switzerland, the disappearance of marsh fever by desiccation of the soil has been followed

closely by the appearance, or by the multiplication of pulmonary phthisis."*

Remarkable evidence is given by the author of the preventative operation of a seafaring life with respect to phthisis. (p. 45.)

"It has been shown that the deaths from consumption in the British army are, in the line, 8·9 in 1,000 men, in the guards 12·5 in 1,000 men; whilst in the British navy, in the years from 1830 to 1836 inclusive, the deaths from phthisis have been in

	Men per 1000.
The United Kingdom	1·7
Mediterranean	1·9
Missions and correspondence	1·9
West coast of Africa and the Cape of Good Hope	1·7
East Indies	1·4
West Indies and North America	1·9
South America	1·7
Average	1·7

The effect of temperature in the maintenance or production of disease is shown by the facts that "yellow fever requires a temperature of 20° centigr. (68° Fahr.) for its development in an epidemic form, and that the epidemic form of plague disappears from Egypt when the temperature approaches 28° centigr. (82° Fah.) On the other hand, typhus is found to prevail in winter and spring, and tends to disappear in summer. It has been remarked that the stokers of steam vessels have a strong predisposition to attacks of yellow fever and to dry colic." The author professes to have remarked, during a mission he undertook in Provence in 1856, an analogous disposition to typhus among the stokers and cooks arriving in steam vessels from the Crimea. The hepatitis of hot climates has mostly been attributed to excessive heat; but tables of the mortality of the army at different colonies prove that locality as well as heat has its peculiar influences. The effect of temperature on the rate of mortality caused by phthisis is worthy of particular notice. It is found that among the troops the maximum of deaths from this disease prevail in the United Kingdom of Great Britain, and that the mortality not only diminishes as the climate becomes warmer in Jamaica, West Indies, Bermudas, Mauritius, and Ceylon, but that an equal diminution takes place as the climate becomes colder, *e. g.* Nova Scotia and Canada. The author observes:

"Perhaps one of the most curious results obtained from our re-

* Drake, Principal Diseases of the Interior Valley of North America, as they appear in the Caucasian, Indian, African, and Esquimaux varieties of its population.

searches into medical geography, is the increasing diminution of the ravages of consumption as we proceed northward from the 44th degree north latitude in America and from the 58th in Europe. This law is shown in England by an almost entire absence of pulmonary phthisis in the north of Norway, in the Faroe islands, and in Iceland. Of 100 deaths from every cause, there are from phthisis: in London, 18; Edinburgh, 11·9; Leith, 10·3; Aberdeen, 6·2." (p. 48.)

Certain localities present diseases occasioned by particular parasitical animals.

"Thus in Iceland, hydatids of the liver attack a seventh part of the population. In Egypt, the *distoma hæmatobium*, which is the real cause of the epidemic vesical catarrh and of the calculous affections which prevail there; tænia prevails all along the African coast from the Mediterranean shores to the Cape of Good Hope. In Geneva, a fourth of the population either have had, or will have, the bothriocephalus; while at Zurich, the tænia solium is alone found. In the east of Europe, the Vistula separates the two species: on the right bank is found the bothriocephalus; on the left, the tænia solium.

"In regard even to the mode of committing suicide, geographical influences prevail: thus the Frenchman blows out his brains in the proportion of three or four to one in comparison with the Englishman, the Saxon, the Norwegian, or the Dane; he drowns himself in proportion of two or three to one of the English. The people of Germanic origin have a preference for death by hanging"

The space which we have already devoted to the work before us, which is of two octavo volumes of above 1,200 pages, is already too much extended to allow of any more quotations from the abundant collection of interesting and novel facts which they contain. We have done our duty in calling the attention of our readers to a work which from beginning to end we have found most attractive. We have been embarrassed by the richness of the materials how to cull the choicest of them for our readers. We agree with the author that—

"The geographical distribution of diseases is a subject of interest to science, to practical medicine, to public hygiene, and to political economy. It throws a light upon the influences of locality, of race and of nationality, in the production of disease; it guides the physician in the choice of a climate most suitable to special disease; it regulates the institution of quarantine, and the enlistment of armies."

It not only does these things, but it enlarges our experience in extending the domain of recognised facts; and when these shall be sufficiently known, we may hope, by careful consideration and analysis, to come to an exact appreciation of the influence of physical causes upon the human body in health

and disease. It is enough for the practical purpose of the mariner that the compass points North and South; and so, for the practical physician, a knowledge of the beneficial or the injurious influence of physical agents may be made a practical science. The mariner adapts his sails to the prevailing breezes, and Mahomet, because the mountain would not come to him, went to the mountain; so the physician, who cannot command the powers of nature, may, nevertheless, so place his patient under influences most favourable either for his recovery from disease, or for the development and perfectibility of the human constitution.

We cannot close this review without paying a tribute to the enterprise of the publisher, M. J. B. Baillière, under whose auspices this work has appeared. We may, however, observe, that both scientific and charlatanic medicine are equally indebted to this enterprise. The tact which perceives the scientific medical necessities of the day is not less than that which perceives the ready market afforded by a depraved public taste and morality for works especially addressed to credulity and sensuality. The publication of such works is as much a stain upon the profession as the work before us is an ornament to it.

B. Daniel.

SALE OF HORSE-FLESH AS FOOD.

OUR respected contemporary, the *Veterinarian*, has an account in the September number, of a visit to the shop of a horse-butcher at Altona (Holstein). The writer, who was making a continental tour, saw exposed for sale the hind quarters and sundry pieces of the flesh of a horse. There were four other establishments of the same kind in the town. The meat was said to have a ready sale at from 2*d.* to 3*d.*, English money, per pound. The butcheries are licensed by the Government, and are under the supervision of the police. Notice has to be given before a horse can be killed, when the department veterinary surgeon attends and examines the animal; and, if it is found free from constitutional disease, notwithstanding it may be incapacitated for work from lameness or other defects, he certifies to that effect, and for the sake of identity brands the animal on its hoof. Within a given time the animal must be killed, and its leg and foot produced for the inspection and satisfaction of the police. It is said that the meat is often bought by persons who cannot properly be said to belong to the lower classes.

THE EPITOME OF SANITARY LITERATURE.

OESTERLEN'S HANDBOOK OF HYGIENE*

PROFESSOR OESTERLEN'S *Handbook* is rather a serious volume of 837 8vo pages in compact type. The subjects of the chapters are: I. Man in his changing Conditions and Necessities: II. The Atmosphere and Meteorological Influences: III. Water and Hydrological Influences: IV. Soil and Telluric Influences: V. Isolated Regions and Topography: VI. Climate: VII. Foods and Drinks: VIII. Dwellings and Public Buildings: IX. Dress, Washing, and Bathing: X. The Generic Functions and Relations: XI. Exercise and Training of the Body: XII. Occupations. The whole concludes with an appendix, in which various questions relating to the duration of life are discussed.

We give thus the outline of a very comprehensive work, which offers but few points to discussion, because it is common sense to a fault, and a stronghold of the facts on which the sanitarian builds his faith. It will gratify English pride to hear that Professor Oesterlen looks on England, not only as one of the purest representations of a free country, but as infinitely more enlightened than other European countries in regard to sanitary science. It will gratify smokers to know that the learned Professor has a good word for tobacco. But it will not gratify the ladies to hear him say that the only real cosmetics are, care of the health, temperance, nourishing food, good digestion, care of the skin, and moderate labour; and that anything else is deception and error. Some of the greasy preparations, he says, may be useful to those living in the north and in the tropics, especially for rubbing into their bodies, to soften and preserve their skin from the effects of the heat and cold, dry air, insects, flies, gnats, etc.; but above all, cleanliness is the best cosmetic.

Simple washing powders may, however, be sometimes substituted for soaps, especially for the fair; such powders for instance as rice-meal, almond-bran, and its extract; wheaten bread, soaked in rain water, or soap, first cut small, then dried in the oven, powdered and mixed with equal parts of wheat meal. The face may also be rubbed over in the evening with linden blossom water, mixed with yolk of egg; a cream of peeled and bruised bitter almond or peach kernels with milk, milk of almonds, and some drops of tincture of benzoin: in the morning this may be washed off again, according to the fashion

* Handbuch der Hygieine, der privaten und öffentlichen. Von F. OESTERLEN, M. Dr. pp. 837. Tübingen: 1857.

of the ancient Roman ladies, with bread crumbs and asses' milk. These cosmetics are in no way injurious to health; but corroding poisonous preparations of metals, above all, arsenic, quicksilver, lead, and mineral acids, like those recommended and sold as cosmetics in the present day, are to be entirely avoided.

QUESTIONS OF THE DAY.*

Questions of the Day are by an anonymous writer. They are a series of elegantly written, simple, soul-earnest essays. Those on our "Criminal Population"; "Rich and Poor"; "Sanitary Reform"; "Sewage and Agriculture"; "Sports for the People"; interest us most deeply. Speaking of the erection of churches *versus* the erection of comfortable dwellings for the poor, the author thus remarks in his *Sanitary Reform* essay.

"It is vain to taunt us with the zeal and self-denial of our forefathers, in erecting abbeys and cathedrals as a tribute to the glory of Him who made them. The enchanting beauty of the steepled minster is not denied. When we look up at the lofty proportions of such a building let us see it as it is seen by those who look down on it from above....And let us sympathize with such survey from a higher sphere, as it lights upon some hovel darkened by the shadow of those towers, low, close, dreary, damp, and filthy, acknowledged to be the adverse to the maintenance of sound health, cheerfulness, and decency, and yet accounted by minster builders quite good enough for those to dwell in, who are made in the likeness of their maker. These, and such as these, who live and die by millions, uncared for in the midst of evil physical and moral, evil whereof much is certainly preventible, these are they of whom ought to be made the living stones of the living temple. What can we do better with our substance than help in fitting them to occupy the place of so high a calling in the order of the new creation?"

There is poetry of thought in these sentiments to which many hearts will respond. Throughout the work the same generous feeling flows; and although we may not agree with the author in all he says, we thank him earnestly for his earnest offering, of the which, whoever reads, will be wiser and better for the effort.

WORK, FRESH AIR, AND EXERCISE.†

The Torquay Early Closing Association have an earnest and able associate in Dr. Radclyffe Hall. He gives in this lecture

* Questions of the Day. By the Creature of the Hour.

† Work, Fresh Air, and Exercise: Essential to Health and Happiness. A lecture delivered at the request of the Torquay Association for early closing. By C. RADCLYFFE HALL, M.D. Pamphlet. Torquay: 1857.

a very complete popular outline of the human physiology, so as to show the necessity of fresh air and exercise for maintaining health and happiness. And, therefore, because these are indissolubly joined, he enforces on the minds of his business hearers and readers to close their establishments at seven o'clock, so that "two or three hours might be given for them and their assistants, male or female, to take out-door exercise; to hold cheerful converse; to ventilate their thoughts as well as their bodies." Dr. Hall delivered this lecture to the inhabitants of one of the most favoured spots in the island for pure air: but even more forcibly must his remarks apply to the denizens of our crowded inland towns and cities. Such would do well to bear in mind, and act up to the following aphorisms:

"Nothing can adequately supplant out-door exercise, especially at that age when nature is finishing her masterpiece of creation—man—in his growth and development. If we want a future race of men to maintain old England's greatness—stint not the rising generation in fresh air. If you want healthy fathers—fresh air. If healthy mothers—fresh air. If you want good men at their work—fresh air. If you want good humoured and hearty wives—fresh air. If you wish your sons to be good looking, and your daughters handsome—give them fresh air and exercise. If you wish for peevishness, irritability, weakness and want, suffering and sorrow—neglect this truth. Be less happy than your Creator made you to be. Sin against knowledge, and regret it too late."

TREATMENT OF FEVER BY FRESH AIR.*

Dr. Barker takes a common sense view of what is required in the treatment of fever. He does not deny that medicines are of use; but he—in common with many of the eminent men of the medical profession from the days of Hippocrates to the present time—insists on the necessity of constantly supplying the fever patient with pure air. But the careful nurse fears, perhaps, that the patient will "catch cold" from the draught. Good old lady, you have quite mistaken the characters of your attendant spirits. While you fear to open the window wide to the pure spirit (who will no doubt be a little spiteful if you stint his entrance aperture) you are keeping a very devil in the room, who is able single-handed to defeat all that the doctors are trying to do for the patient's good. But open the window so that the good spirit may chase out the evil one; and you will see what Dr. Barker has witnessed and described.

* The Treatment of Fevers, with Special Reference to Ventilation. By T. Herbert Barker, M.D., F.R.C.S, etc. Read before the Annual Meeting of the British Medical Association at Birmingham, July 30th, 1856. pp. 50. London and Bedford: 1857.

"I speak positively in saying that I have never seen anything but good result from these measures; and this sometimes so markedly that the most common-place observer could not but have detected it. If the patient is in the first stage of the disorder, the efficiency of the pure air wards of the second stage; if he is in the second or third stage, the relief is occasionally magical, and can only be compared to what occurs when, during an experiment, an animal is taken out of a chamber containing some narcotic vapour, and is allowed to breathe the pure elements by which life is supported."

CHOLERA IN LOWER ANIMALS.*

Dr. Lauder Lindsay has for some time taken much interest in the investigation of the question of the communicability of cholera to the lower animals. His paper contains a series of carefully proposed etiological and pathological problems, in regard to which he invites contributions from observers. We extract the chief starting questions with regard to causation:

"I. Are sporadic and epizootic diseases of the lower animals, which have been observed prior to, during, or immediately subsequent to, epidemic cholera in man, not equally common at other periods, when there is no presumptive evidence of any cholera poison existing in the atmosphere? If so, wherein do they differ from, or resemble, the same diseases occurring during the prevalence of cholera in man?

"II. What is the precise connection between coincident epidemics in plants, the lower animals, and man, in regard to causation? Is it merely coincidental, or are they really due to a common cause? And, if so, what are the laws which regulate the influence of the same atmospheric poison on these different classes of organized beings?"

We hope Dr. Lindsay will meet with success in his endeavours to investigate the connexion of epidemic and epizootic diseases.

LIFE ASSURANCE.†

Dr. S. Ward publishes a useful little handbook for Medical Referees to assurance offices. The different elements which enter into the medical estimate of life are reviewed; viz., Sex, Age; Married or Single State; Personal Peculiarities; Habits; Occupation; Residence; Family History; Previous Illnesses or Accidents; Vaccination; Present Health; and Peculiarities

* Suggestions for Observations on the Influence of Cholera and other Epidemic Poisons on the Lower Animals. By W. LAUDER LINDSAY, M.D., Perth. Pamphlet. pp. 15. Reprinted from the *Edinburgh Medical Journal*, July 1857.

† On the Medical Estimate of Life for Life Assurance. By STEPHEN H. WARD, M.D.Lond. pp. 71. London: 1857.

affecting the Female. The temperate friends of the pipe will read with satisfaction Dr. Ward's opinion that there is no evidence whatever to show that this practice (smoking tobacco), "when had recourse to in moderation, and not complicated with spirit-drinking, at all tends to shorten the duration of life. Addiction to it in great excess may doubtless induce dyspepsia, nervous affections, possibly paralysis, certainly delirium tremens."

EXCESSIVE ATMOSPHERIC PRESSURE THE CAUSE OF CHOLERA.*

Dr. Poznanski believes that in the circulation of the blood two forces are concerned—an active, arising from the circulatory organs; and a resistent force, consisting in atmospheric pressure. The centrifugal force, or normal circulation, of the blood, he states to be the result of the due adjustment of these forces. In cholera, the balance is deranged, he argues, by an excess of the atmospheric pressure. In support of this view, he adduces, with other arguments, the following. Cholera is endemic in countries subject to excessive atmospheric pressure, as the East Indies, South Carolina, and other similar regions. Epidemics of cholera have always been preceded and accompanied by an excess of atmospheric pressure; and their intensity has been in proportion to the excess. There may be much truth in what Dr. Poznanski says; but we should imagine him to be, like many others, a man of one idea.

Several other works lie on our table, but we can only mention them. The Directors of James Murray's Royal Asylum for Lunatics, near Perth, have issued their *Thirtieth Annual Report.* This asylum, it will be recollected, is conducted on the most enlightened principles. Mr. H. W. Lobb publishes a pamphlet on a preparation of cow's milk partly deprived of casein, so as to fit it for the use of infants. He therefore gives it the euphonious title of *Mincasea (minus casei).* It may be very good; but the affair looks too commercial. Dr. Hyde Salter's *Introductory Address,* delivered at the opening of the Twenty-third Session of the King's College Medical Society, in October 1856, contains some good arguments in favour of combination among students for mutual professional improvement. We have received *Sanitary Reports* from Messrs. Nicholas, Whiteman, Godrich, Pearce, and Drs. Conway Evans and Septimus Gibbon. They contain much valuable matter. Preparations are being made for a complete *resumé* of all the documents.

* De la Nature, du Traitement, et des Préservatifs du Choléra. Par F. X. POZNANSKI, Docteur en Médecine de l'Académie de Wilno. pp. 51. Paris: Baillière et Fils. 1857.

ORIGINAL COMMUNICATIONS.

THE HYGIENE OF THE TURKISH ARMY.

By J. N. RADCLIFFE, M.R.C.S.Eng., late of the Staff of His Highness Omar Pasha.

(*Concluded from* p. 157.)

IV.—THE CAMP.

A TURKISH camp has commonly a very pleasing aspect, the Turkish soldiers being well versed in those arts which give order and neatness to an encampment. The tents are pitched well and with great regularity; they are not crowded together, nor fixed too far apart, and generally the ground in front and in the intervals of the lines of tents is carefully cleaned and smoothed; or if it be apt to retain much moisture, it is neatly paved with stones, forming a capital stand for the arms, and enabling the men, in wet weather, to enter their tents without dragging along with them heavy clods of tenacious mud. The latrines are placed sufficiently in the rear, and they are usually made with great care. During the Crimean war no other section of the allied forces equalled the Turkish troops in the construction of latrines. A deep hole is dug, and this is in great measure covered in, a small aperture only being left, above which is pitched a latrine tent, or, if brushwood be at hand, a hut is often erected. Thus the eye is not offended by those huge and filthy holes which were in common use among the soldiers of the English, French, and Sardinian armies, and the stench from the latrines is materially diminished.

But order and neatness are not equivalent to a good hygienic condition of a camp; and while, on the one hand, a well pitched Turkish encampment might be held up as a model to other armies, on the other hand the Turkish soldier has certain pestilent habits which render an encampment as offensive as can well be imagined. He scatters offal about most carelessly, and he has a singular aversion to the use of latrines, notwithstanding his care in their erection, and if practicable, he will almost invariably retire to the verge of the encampment; hence it happens that its immediate vicinity, as the nostrils and the eyes too readily detect, is commonly defiled in the most disgusting manner.

In the fine seasons of the year, and when near wood, the Turkish soldier will, with great ingenuity, embellish and add

to the comforts of an encampment by erecting bowers and shades of foliage, beneath which he delights to recline during the warmer hours of the day, in preference to remaining within the hot tent. A Turkish encampment, under such circumstances, is a singularly attractive spectacle.

After the advance upon the Tchernaya in May 1855, the Turkish forces took up a position on the low ridge of hills which traverse the plain of Balaklava. The white tents were pitched with great regularity upon the eastern face of the ridge; and upon the summits of the hills, and in front of the different groups of tents, were erected bowers and shades of the most varied character, and formed of branches of shrubs and trees obtained from the wooded hills on the right. There were large sheds, open on every side, and elaborately constructed bowers, and a multiplicity of small huts. Even the cooking places were hedged in with foliage, or hutted over. The aspect of these constructions of rich green foliage was very beautiful; and even when the fresh colour began to fail, and it became spotted with brown and yellow as the leaves faded, the bowers and huts had still a most pleasing effect upon the eye.

The Turkish soldier, when on the march, shows also considerable ingenuity in erecting temporary shelters of boughs and foliage to protect himself from the heat of the sun by day, and from the wind or dew by night.

The tent used in the Turkish army is the ordinary bell-tent. It is formed of two layers of strong cotton; and, when properly pitched, it has within, at the base, a diameter of about fourteen feet. It is well made, and upon the whole it resists wet well.

The regulation number of men to each tent is ten, but the actual number is almost always in excess, and not unfrequently it is fifteen.

The Turkish soldier makes himself very comfortable within a tent. If he be encamped for any length of time upon one spot, or even if it be for a short period only, he will contrive to arrange his tent so that he may have in it the height of compaigning comfort. He displays excellent skill in the formation of a floor that presents few asperities to his feet as he walks upon it shoeless, or to his sides when he is laid down; he banks up the flaps well with earth, and trenches the tent round, so as to diminish the chances of wet or of wind intruding; and in rainy or cold weather, he will ingeniously build, of loose stones and mud, a small fireplace within his tent, so that he may conduct there the whole process of his cooking. He possesses also, in a high degree, the art of making his tent as little permeable to

the weather as possible, by walling it round, or sinking it in the earth, during winter.

The Turkish soldier has, however, very imperfect notions of the benefits of pure air. He likes to bask in the sun and lounge in the open air in fine weather; but he cares little about the condition of the atmosphere he breathes, and, it mattered not how foul the air in his tent might be, it was rare to see him take measures to purify it.

A bell-tent, although probably a convenient tent for carriage and for pitching, is not capable of thorough and effective ventilation; and this becomes a question of some moment, when a tent is pitched for a considerable length of time upon one spot. It is usual, and indeed necessary, to raise the flaps of a bell-tent to ventilate it, but, if the tent be well banked, this is an awkward and most troublesome method; moreover, it can only be had recourse to in fine weather, for in wet or windy weather it leads to too great exposure and discomfort.

The defective ventilation of tents, an evil which is dependent upon the necessity for making them as weather-proof as possible, and which is found, more or less, in tents of every form, is important, inasmuch as it intensifies the action of emanations arising from decomposing animal and vegetable matter, the most general and powerful source of atmospheric pollution to which a camp is liable. In the crowded and confined tent the soldier suffers most from an atmosphere thus vitiated, particularly when at night he is sleeping upon the ground.

The double-poled, or Arab tent, which was used by several of the French regiments in the Crimea, seemed to be, hygienically considered, a much better form of tent than the bell-tent. The former is larger and more commodious within, and its interior can, on either side, be thrown fully open to the air. It is doubtful, however, how far tents of this form admit of being so readily pitched and managed as the bell-tent, and whether they are so well calculated to stand rough weather.

Attempts have been made to obviate the defective ventilation of the bell-tent by apertures placed at the summit and variously guarded; but this method of ventilation has not been so successful as to lead to its general adoption, and it is liable to some objection in stormy weather.

During the Crimean war, none of the soldiers of the allied forces appeared to get on so comfortably under canvass as the Turkish soldiers. The English, French, and Sardinian soldiers put up with the mode of life as a necessary evil of campaigning, and they made themselves as comfortable as practicable under

the circumstances; but the Turkish soldiers, although having their peculiar grievances, seemed to settle down more comfortably under canvass than the soldiers of the other forces, and to be actually more comfortable.

This probably arose from the domestic habits of the Turk being such that in a tent-life, and in camp-life generally, as it affects him, there is not that great change in the mode of living that there is among the English, French, and Sardinian soldiers.

It is customary among the class from which the soldiers and the bulk of the inferior officers of the Turkish army is derived, for a whole family, though large, to occupy during the day, and also at night, one room only of a house, even if the house contains several rooms, and in that room to live, cook, and sleep. Moreover, carpets or thin cushions, placed upon the floor, constitute the sole necessary and the usual articles of furniture, and serve for seats by day and beds by night. The cooking apparatus is equally simple, two or three metal stew-pans and a frying-pan serving for a family; and the articles of food differ in no respect from those issued to the army. Hence it happens that, as a soldier, the Turk finds little in the crowded tent that is at variance with his habits; he has in the carpet which is issued to him a full allowance of household furniture; in every mess there is an amount of cooking utensils almost equal to, and in no way differing from, what he has been accustomed to in his own dwelling; the food which he receives as rations is in character and quality such as he has always been used to, and he can cook it in those fashions to which he has been habituated, and which he prefers most.

That this comparatively slight degree of change between the habits and method of living in ordinary life and that of the soldier's life, has no small influence in contributing to the efficiency of the Turkish soldier in the field, there can be little doubt.

V.—THE HOSPITAL.

My acquaintance with Turkish Military Hospitals was confined solely to the temporary hospitals in the Crimea. A description of the hospital at Balaklava will give a correct idea of the general character and management of the Turkish Field Hospitals during the Crimean war.

The hospital at Balaklava consisted of twenty-eight huts, which were situated in an almost central position within the lines on the heights east of the village. The position of the hospital was good, although not easy of access, for it was at an

elevation of nearly six hundred feet above the lowlands, and it was freely open to the winds, without being too much exposed; there was every facility for drainage and cleanliness, and numerous and copious springs of water were in the vicinity.

The huts were of British construction; they were built of ¾ths of an inch planks, and the roofs had, with few exceptions, a water-proof felt covering. Twenty-four of the huts were of the same form and dimensions as those in use among the British troops, and they measured 28 feet in length, and 16 feet in breadth; the height of the side walls was 6 feet, and that of the summit of the roof was from 11 to 12 feet. Within was a central pathway, 3 feet in width, which ran from end to end, and on each side was a wood flooring raised 6 inches from the ground, and 6½ feet in width. Each of the huts had two windows, one being placed at each extremity. The windows were 3 feet square, they were elevated six feet above the floor, and the sashes were glazed and moved on a transverse axis. There was a single door to each hut, and it opened in the majority towards the south—the huts being arranged so that the longitudinal axis was almost directly north and south.

The huts were placed very close together, the intervening spaces not measuring more than six feet, and each hut was trenched round, but in a very imperfect manner; moreover, the trenches had no communication with each other, and no proper outlets.

The huts were erected early in 1855, and during the hot season the wood warped and cracked considerably. The walls were neither painted nor white-washed within or without, and in the space beneath the flooring swarms of mice and rats found shelter.

There was no effective mode of ventilating huts of this construction without discomfort to those within, and constant care and watchfulness were necessary in order to keep the walls and roof in the condition requisite to exclude wind and rain. In all such attentions as were necessary for the preservation of the integrity of the huts, the hospital authorities and the Turkish soldiers were wanting; and the previous condition of the walls during the summer and autumn of 1855 was perhaps occasioned less by the slightness of their construction than by the carelessness of the Turks. The means for any trifling repair, even to the extent of a few nails, were rarely at hand; and the only method adopted to prevent the intrusion of wind and rain through the numerous crannies of the warped wood-work was by pasting paper over them.

The remaining huts were of small dimensions, and they were well constructed, and painted externally. These huts were appropriated to sick officers and the resident surgeons.

Each of the large huts accommodated fourteen patients, and to each hut were attached two orderlies, who lived and slept along with the sick of whom they had charge. No bedsteads were used, the patients being laid upon good flock beds of about four inches in thickness, which were placed (after the fashion of the East) upon the floor. The beds were covered with thick, white, and soft cotton, and each bed was provided with a sheet of the same material, and a heavy white coverlid. Additional covering might be had if required, but it was rarely necessary, as each patient had his great coat along with him. The beds and bed-linen, and indeed the patient's dress generally, were almost invariably kept clean, and the principal portion of the materials being white, the aspect of the occupied huts was usually neat and satisfactory. The bedding and clothing of the patients were much less infested by insects than might have been anticipated from the construction of the huts and the peculiar habits of the men.

At the head of every bed was suspended a ticket, upon which was noted the name, age, father's name, province, regiment, battalion, and time of admission of the patient.

The hospital dress consisted of a long, blue, wide-sleeved, loose coat, of indifferent texture, in addition to the usual under-clothing of thick cotton.

Each hut was provided with two large and very useful basins for the general use of the occupants, a sufficient number of small basins for food, cups, plates, spoons (all of which utensils were made of metal), sponges, a charcoal-burner, and a tub or a number of bottles for containing water.

Within the huts a considerable degree of cleanliness was maintained, but external to them cleanliness was little heeded. The vicinity of the hospital was most foully littered with filth, in consequence of the abominable habit which the Turkish soldiers have of avoiding latrines.

The latrine for the general use of the patients was placed about thirty feet from the huts. It was a capacious trench of about twenty feet in length, and a rough construction of planks had been erected above it. To the left of the latrine, at a distance of about thirty feet, was the cooking-house, and in its rear a hut for stores. In the space between these buildings and the latrine, it was customary for many months to kill the oxen and sheep required for the use of the hospital. The whole of the blood from the slain animals was allowed to

run, and the refuse was thrown into a hole behind the store-hut. This hole was distant about fifty feet from the hospital huts, and it was full to overflowing of decomposing animal matter, from which arose a formidable stench.

Notwithstanding the contiguity of this sink of abomination and of the latrine, and that the ground was in a most filthy state, a short time previously to the removal of the Turkish forces from the neighbourhood of Balaklava to Mingrelia, several tents were pitched, for the accommodation of sick officers, in the open space between the cooking and store-huts and the latrines. Two detached latrines were also formed in the rear of these tents, and close to the walls of the store-hut.

The bed-pan used in the hospital was an iron vessel of very inconvenient form and size. This utensil was, however, too rarely had recourse to, and it was often painful to witness patients, seriously prostrated from disease, conducted to the latrine by an orderly.

The huts were heated when necessary by stoves, or by braziers, termed *mangals*, and fed with charcoal. The charcoal is ignited in the open air, where it is kept until it becomes incandescent, when it is in a state fit for use in an apartment.

The *mangal* is a very objectionable means of obtaining warmth, particularly in crowded quarters or tents, for the men, in order to secure the greatest degree of heat, invariably close every accessible aperture by which air can find admission; and under such circumstances, the fumes of burning charcoal, however carefully it may be managed, become an important additional source of atmospheric vitiation.

The food issued to the patients was generally good, and it was sufficient in quantity. The daily diet-scale of the hospital was as follows:—

Full Diet. Bread, 200 drachms (22½ oz.); rice, 92 drachms (10⅛ oz.); "yagh," 8 drachms (nearly 1 oz.); meat, 100 drachms (11¼ oz.); onions and other vegetables in variable quantities, and salt.

Half Diet. Bread, 100 drachms (11¼ oz.); rice, 80 drachms (9⅛ oz.); "yagh," 8 drachms (nearly 1 oz.); and meat, 50 drachms (5⅝ oz.)

Low Diet. Bread, 33⅓ drachms (4 oz.); rice, 50 drachms (5⅝ oz.); and weak soup made from mutton or beef, as much as might be required.

Coffee, sugar, and tobacco were provided for the sick, if ordered by the surgeons in attendance; and the food was

cooked in a manner similar to that in common use among the soldiers.

The dispensary appeared to be tolerably well furnished, but I am unacquainted with the character and quality of the drugs which were used. The surgical stores were of the most meagre description, and the instruments contained in them were insufficient for the satisfactory performance even of the minor operations.

There were two surgeons and two apothecaries resident at the hospital, and it was visited frequently by the principal surgeon of the forces.

The medical staff of the Turkish army is a very heterogenous body. Attached to it are many Germans, Hungarians, Italians, Frenchmen, etc., who have studied, or profess to have studied, in the medical schools of their respective countries. Some of these men have been driven into the Turkish service by necessity; and among them are to be found several whose talents are of no mean order, but their merits are crushed beneath the mass of ignorance with which they have to contend, and the discomforts of the degrading position in which they are generally placed; others are simply adventurers whose knowledge of medicine and qualifications to practise it are very dubious.

The Turkish medical men have been, with few exceptions, educated at Constantinople or at Alexandria. Some have a highly creditable acquaintance with their profession in its different branches; but others, and by far the greater number, are very ignorant.

The surgery which I saw practised at the Balaklava Hospital was exceedingly barbarous, and the medical practice was of a somewhat haphazard description. Preparations involving a multitude of constituents, such as were delighted in by physicians a century and a half ago, were much used; and *mithridate*, a preparation of wonderful complexity, which was considered by our forefathers to have great virtue as an antidote to poison and to pestilence, was a favourite remedy for cholera, with at least one of the hospital surgeons, a man of mature age and standing.

But it is not to be forgotten that great difficulties are experienced in teaching and acquiring scientific medicine in Turkey, from the general want among the students of that preliminary education which is essential to prepare the mind to comprehend correctly the truths of any science; from the, as yet, unmanageable character of the Turkish language as a means of conveying instruction in medicine, in consequence of

the want of a scientific terminology; and from the obstacles which hinder an efficient tuition in the French language. With these impediments, the talented professors who occupy, and have occupied for some time, the different chairs at the Turkish schools of medicine, have to contend; and it is no wonder that their leaven has not yet pervaded the whole of the native members of the Army Medical Staff.

Notwithstanding the ignorance which too commonly prevails among the Turkish surgeons, there is, nevertheless, in the Turkish army, a sufficient amount of medical skill to effect considerable good among the soldiers, if it were properly fostered and supported. The medical staff seems, however, to have literally no influence in controlling those matters which most concern it. It is slighted by the Porte, and its requirements are unattended to by commanding officers. Indeed, it is probable that the short-comings of the Army Medical Staff are due as much to neglect of this kind as to the medical men themselves.

Over all that relates to the provision of food, clothing, and shelter for the sick, the medical man has little or no control; yet these things have peculiar reference to his duties, particularly during harassing campaigns, when the soldiers are most commonly broken down by diseases which arise from fatigue and want, and when the treatment required for the sick is the administration not so much of medicine as of a diet which the ordinary stores of a hospital do not usually admit of. Under such circumstances, the requisitions of the Turkish medical staff are usually unattended to.

The special requirements of the medical man are, moreover, thwarted by the character of the stores placed at his disposal. Large quantities of worthless and useless drugs and preparations, the names and uses of some of which are occasionally not known, are sent to the different depôts yearly. The surgical appurtenances, also, are exceedingly scanty and imperfect, and occasionally they are wanting almost altogether. Much, therefore, as the ignorance of the medical men has to do with the degraded and inefficient condition of the healing art in the Turkish army, it is not the sole cause of that degradation and inefficiency. The ignorance of commanding officers, and that system of official dishonesty, of which the bad condition of the medical stores is an illustration, contribute equally to these results. Any efforts for the reform of the medical staff and administration of the Turkish army, unaccompanied by reforms in the government executive will doubtless fail.

The hospital at Balaklava was under the supreme control of a military officer, a Bey, who had the power of providing whatever might be required in addition to the ordinary supplies of the hospital.

The conveyance of the sick and wounded of the Turkish army during the Crimean war was effected principally by means of Tartar wagons, buffalo wagons, and pack-animals. The Tartar wagons (few in number) were, I believe, part of the spoil of Eupatoria. They were light, four wheeled vehicles, covered in, and they answered well for sick conveyances. The buffalo wagons were vehicles of the rudest construction. They had four wheels, but the wheels rarely approximated to a circle, and each wheel generally differed from its fellow in diameter. The bottom was formed of three or four pieces of rough undressed timber, and the sides had a rude railing inclining outwards.

On the evening when the Mamelon Vert was assaulted and captured (June 9th, 1855), a division of Turks having been moved into the trenches on the right of Careening Bay ravine, an order was sent to the officer in charge of the hospital at Balaklava, directing him to send all the patients fit for removal to Eupatoria, so that every preparation could be made for the reception of any wounded men who might be sent from the front. A little before sunset, about twenty-five buffalo wagons, of the character just described, slowly ascended the road to the hospital. At the same time a movement was observed amongst the huts, and very soon about two hundred and fifty patients were, with their packs, placed on the ground in front of the huts. Many of these poor fellows were quite incapable of sitting up, unless supported. When the patients to be removed had all been got together, the process of placing them in the wagons commenced; but before the whole of the vehicles were freighted night had fallen. It was near ten o'clock when a chorus of the dismalest creaks that ungreased axles could emit, announced that the wagons had started with their loads of suffering. For several hours had the invalids, most of whom were affected with diarrhœa or fever, been kept in the open air upon the ground; then came the rough and slow journey in the wagons, and after that would be the embarkation.

The most common mode of conveying the sick was by pack-animals, the patient being placed astride of an ordinary pack-saddle. I have frequently seen invalids fall off the animals exhausted, and lie by the road-side for some time before they were again able to mount. I have witnessed instances of this kind occur within a short distance of the hospital, yet no

assistance has been given; the sick man lying upon the ground, the leader of the pack-animal sitting by him, until he was able again to proceed.

About twenty mules, with seats for the sick and wounded, after the French fashion, were attached to the Turkish force before Sebastopol during a part of the war, and they did good service.

I had no means of ascertaining the average sick-rate of the Turkish army in peace, or during the Crimean war.

In the winter of 1854-55, the Turkish force at Balaklava underwent great privations, and suffered from excessive sickness.

In the summer and autumn of 1855, much sickness prevailed among the troops at Eupatoria. The hygienic condition of the town and of the entrenched camp, particularly of the former, was bad. The streets were little better than foul drains in wet weather; the court-yards were generally littered with filth, and the portions of the town which were occupied by troops, and the camp, were much crowded. The rations were deficient, fresh meat and vegetables, and the full allowance of fresh bread, being rarely issued; and the water chiefly used was brackish. Scurvy of a serious character broke out and affected many of the men, and continued fever became rife.

The Turkish force, which was encamped before Sebastopol, during the same period was plentifully rationed, and it had usually good health. In the summer, diarrhœa and cholera broke out in this force, but the diseases did not prevail to any great extent.

It is difficult to account for the good supply of food to the Turkish force before Sebastopol, while the troops at Eupatoria were so wretchedly rationed; unless it be surmised that, in the former instance, the Turkish military authorities were aided by the British Commissariat.

An interesting illustration of the capabilities of the Turkish soldier is afforded by the state of health which existed among the soldiers of the Turkish Contingent while that force was stationed at Kertch. I have been favoured with the following particulars respecting the Contingent by Dr. Milroy, one of the Commissioners appointed to inquire into the sanitary condition of her Majesty's forces in the Crimea.

The men were large and muscular, their age was generally from 20 to 25 or 28 years, and they were capable of great and continued exertion, as was shown by the large amount of labour they underwent in the formation of entrenchments,

roads, etc., in addition to their ordinary field-duties. The strength of the force was somewhat more than 16,000 men, and, previously to the 1st of January, 1856, the average number of sick in hospital did not exceed 320, being under two per cent. The average number of admissions into the hospital per week was from 80 to 100, or much below one per cent. The deaths were about ten per cent. of the admissions, or at the annual rate of about 28 or 29 per 1,000 of the force. During the first five weeks of 1856 the rate of sickness increased to about 2·1 per cent., and in the second week of February scurvy appeared, and the sick rate rose to nearly five per cent.; but the mortality was not increased. The augmented rate of sickness in January and February was coincident with greater severity of the weather; and the determining causes of the scurvy were apparently an irregular supply of fresh meat and vegetables, and greater exposure. The troops which suffered most from the disease were those which were hutted in the most exposed situations. A prompt supply of fresh vegetables and lime-juice, and the removal of the affected troops to better quarters, speedily restored the health and efficiency of the force. The men were well clothed, and they received their pay regularly; their rations were similar to those furnished to the Turkish army; their habits were temperate, and, as is customary with Turkish soldiers, they drank no spirituous fluids.

"The very favourable condition of the health of the Turkish Contingent, notwithstanding some obvious sanitary defects in their camps, speaks volumes as to the preservative influence of temperance, and the disuse of intoxicating liquors, and the lesson should not be forgotten." I would add that the natural physical powers of the men, the mode in which they prepared and the times at which they eat their food, and, with the exception of their duties, the comparatively slight change between the mode of life in the camp and the habits in which they had been reared, would not be without influence in maintaining the healthy state of the force.

I had no opportunity of becoming acquainted with the barrack life of the Turkish soldier.

Bramley, near Leeds, May 1857.

ON THE HEALTH OF LONDON DURING 1856.

By JOHN WEBSTER, M.D., F.R.S., etc.

THE metropolitan population generally enjoyed, in 1856, like other portions of the British empire, a very satisfactory degree of public health; the total deaths being less numerous than during 1853-54 and 1855, notwithstanding the great increase of population. In 1856, the aggregate mortality, throughout all the metropolitan districts, numbered 56,786, or 4,720 fewer than during 1855; although that year was considered likewise salubrious. In reference to particular quarters of the year, a somewhat striking uniformity prevailed. The autumn, however, showed the smallest mortality; the deaths being in that quarter 14,066. In the previous three months—ending June 28th—14,069 were recorded. Next in amount comes the fourth quarter, when 14,118 fatal cases were reported; while the season which exhibited the largest death-rate were the months of January, February, and March, when 14,533 persons died. Taken altogether, every season appears therefore to have been uniformly salubrious; and if the average be calculated according to the actual inhabitants living in London, the ratio then ranged as only one death in every forty-six residents.

Such results constitute a very low mortuary scale; and, if compared with previous years, or with many other large capitals, either in Europe or elsewhere, it becomes even more remarkable. For instance, in Paris, the proportion reached one death in about 30 residents; and in New York one person died in at least every 25. Other towns—teeming with human beings, and similarly confined in very limited spaces—might be also now mentioned; but it seems superfluous, as all concurrent facts prove that London is by far the most healthy capital of the world, notwithstanding its enormous population, and the numerous existing causes of disease which still prevail.

1. *Diseases showing an increased Mortality.* Notwithstanding the marked salubrity of last year, several maladies manifested an augmented severity; and hence were followed by a larger number of deaths than during the twelve months immediately preceding. Thus, measles proved fatal to 1,445 persons against 864 in 1855. By diarrhœa, 2,251 died, instead of 2,061 in the same period; by dysentery, 165 against 142; by typhus, 2,645 in place of 2,332; by syphilis, 209 against 168; by nephria, 237 against 200; by diabetes, 50 against 38; and by carbuncle, 78 against 53; this, however, is not so great a mortality from that affection as occurred in 1854, when 91 fatal cases of carbuncle were recorded.

Although the total deaths by accidents, viewed in the aggregate, were rather fewer during 1856 than the previous year, the numbers being 1831, instead of 1803 reported during 1855; still, under several specific heads, there appears an augmentation. For example, 97 persons died by poison, instead of 85, in 1855; by suffocation, 174 instead of 158; by drowning, 378 instead of 324; and by wounds 112, instead of 100 in the former period. On the other hand, fewer persons lost their lives by fractures; the comparative numbers being 620 cases in 1856, instead of 652 during the previous year. These varied facts, regarding fatal casualties in London, are very interesting, in so far that they indicate that, however numerous may be the specific causes of violent deaths, throughout the immense metropolitan population, the average amount of such events, happening one year with another, seems to exhibit very little variation. For illustration, by drowning, during the past five years, viz., 1852-6, the total deaths were 353, 355, 344, 324, and 378 respectively. In fact, nearly the same number of residents have their mortal career thereby cut short annually in London, as also through other violent means, however different various collateral circumstances may often appear.

II. *Diseases proving less Fatal.* Several maladies have, on the other hand, exhibited a diminished rate of mortality, which sufficiently account for the late satisfactory condition of public health. This will be seen by the subjoined table.

Diseases.	Deaths in 1855.		Deaths in 1856.
Small-pox	1024	....	522
Scarlet fever	2602	....	1795
Hooping cough	2414	....	2078
Influenza	168	....	52
Remittent fever	104	....	88
Erysipelas	402	....	388
Dropsy	829	....	728
Hydrocephalus	1531	....	1351
Phthisis	7545	....	7196
Cephalitis	603	....	510
Apoplexy	1382	....	1306
Paralysis	1180	....	1133
Insanity	133	....	78
Convulsions	1937	....	1872
Bronchitis	5512	....	4482
Pneumonia	3992	....	3621
Asthma	728	....	585
Enteritis, gastritis, and peritonitis	656	....	550
Hernia	166	....	137
Ovarian dropsy	49	....	38
Childbirth	272	....	246
Intemperance	72	....	56
Starvation	35	....	28

III. *Diseases having the same Ratio of Deaths.* Analogous to results observed during preceding years, and notwithstanding the enormous yet ever changing population of the metropolis, various maladies often show an extraordinary uniformity in the number of deaths thereby produced.

Diseases.	Deaths in 1855.	Deaths in 1856.
Purpura	51	50
Hæmorrhage	213	210
Fistula	19	19
Gout	59	60
Laryngitis	283	283
Ulceration of intestines	122	122
Ileus	150	151
Hepatitis	181	177
Rheumatism	233	232

The above statements are exceedingly interesting, and well deserve the attention of medical statists, as likewise of those occupied in the investigation of contingencies affecting human life, and its probable duration.

The large amount of infants who fall a sacrifice to the "want of breast milk" constitutes a great calamity; and if it cannot be checked, the real source deserves unmeasured condemnation. Since this frequent cause of death has been noticed in the metropolis, it seems to have gone on every year augmenting. Thus, during 1848, the number of infants who died thereby was 171; in 1852, 276; and in 1856, 366, or double those recorded eight years before. Such facts ought to make an impression upon those—often amongst the highest ranks—who patronize a system which leads to such disastrous results. Irrespective of the very injurious consequences thus inflicted upon many innocent babes of the poor, nothing proves so beneficial both to the offspring as well as to the individual health of the parents as to follow the true dictates of nature, which say, "*Every mother should nurse her own child.*" Were this done, the above sad results would very rarely supervene. It has now become high time for the medical profession to interfere, and by every available means in their power endeavour to check the practice to which reference is here made. Exceptional cases may certainly sometimes occur, where the mother cannot suckle her own child; but then, greater care should always be taken by such persons, that the wet nurse's infant be not itself sacrificed.

Although an improved state of health, as a whole, prevailed generally throughout London during all last year, the mortality varied in particular districts. Thus, the ratio ranged low in the western and northern, contrasted with the eastern, portions of the metropolis. For example, Westminster, formerly con-

sidered less salubrious than the more elevated parts of western London, exhibited a decided decrease in the total number of deaths; which result has been ascribed, and justly, to measures of sanitary improvement recently effected. Again, in both Kensington and Islington — heretofore esteemed desirable neighbourhoods for residences—the mortality shows a decided increase.

The discrepancy manifested in reference to typhus, and its fatality, being a good criterion of the average health enjoyed by residents in particular localities, it becomes instructive to state, regarding this disease, that in the east districts—having a population of 485,522 persons—the deaths by typhus were 793, or 1 in 612; whereas, in the west districts—containing 376,427 inhabitants—the fatal cases were 326 by the same disease, or 1 in 1,124. Scarlatina also proved more than twice as fatal in the eastern as in the more western portions of London. These facts are in accordance with previous and general experience; the west and north districts of the metropolis being usually most salubrious, and hence far less affected by epidemics under ordinary circumstances.

Amongst the total 56,786 deaths recorded during last year, 10,381, or nearly one-fifth, occurred in charitable institutions, more than half being among inmates of workhouses, the majority of the latter category being females. It is worth noticing that, both in workhouses, and in the metropolitan general hospitals, the total mortality has, of late years, been regularly diminishing. Similar data, with regard to mortality, have lately been likewise obtained in military and naval hospitals, as also in lunatic asylums.

In prisons, although their actual population always averages upwards of 6000 persons, 81 deaths only were reported; 64 being males, and 17 females. This result shows the present marked salubrity of these establishments, altogether very different from what prevailed in and previously to the days of Howard, when to be committed to durance vile in any London jail was almost consigning the unfortunate individual to certain prospective death. Now, in many instances, confinement in prison becomes an efficacious means towards the restoration of physical health; whilst it at the same time often promotes moral improvement.

In the four metropolitan Lying-in-Hospitals, 14 deaths only occurred among all the puerperal women under treatment, during 1856. At the Queen Charlotte establishment, not one fatal case through child-birth was recorded. With respect to institutions for special diseases, it may be observed

that the Fever and Consumption Hospitals alone seem worthy of remark on the present occasion; 279 deaths having occurred at the former, and 181 in the latter. At the Fever Hospital, the deaths were almost equal in both sexes, being 140 to 139; while by phthisis 114 males and 67 females died, or nearly two of the former to one of the latter. This statement, however, only shows that more male patients were then admitted, but it does not prove consumption to be in a higher degree fatal among them than among the other sex.

In the garrison of London, comprising the three regiments of guards, only 44 fatal cases by disease are reported during 1856, which makes a very small mortality.

Increase of Population. More births took place during last year than in any previous one; the total number of children then born being 86,833, exceeding by 30,047 the whole mortality recorded. Irrespective of the annual immigration constantly in operation, it is thus easy to explain the great increase of London during recent times, since more persons are born in every year within its precincts than those who die. Should events proceed at the same ratio as now, in a very short period London will then contain upwards of three millions of inhabitants, or more residents than many European kingdoms possess.

A few general observations may be now made in reference to one or two classes of persons; such remarks being, however, confined to parties chiefly occupied in mental occupations. Respecting the three learned professions, it appears that last year, amongst lawyers, one died in every 64 then living; amongst medical practitioners, one in 55; and amongst clergymen and religious teachers, one in every 37. Amongst law-students the proportion of deaths was much less than that exhibited by medical pupils; the rate of mortality in the former being only one in every 141, while in the latter it appears to have amounted to one death in every 62. In fact, these data would warrant the inference that the contingent probability of death was not only greater among medical men than among lawyers in active practice, but likewise when studying their respective professions.

Metropolitan physicians frequently attain very advanced ages. Thus, among the 68 Presidents of the College of Physicians, since its foundation in 1518, although the ages of only one-third of that number are known, eighteen had passed 70; ten of them were octogenarians and beyond, two of these being nonagenarians, the oldest having reached 93 at death; viz., Dr. Collins, who presided in 1695, and died in 1710.

At present, two members are alive who exceed 90 years, one being 92; while very recently three others died who had attained almost equal patriarchal ages, one being 93; thus showing that London physicians are often long lived, which fact becomes more remarkable when it is known that the class is not numerous. The proportion of deaths among merchants to the living ranged at one in 51 during 1856, but in commercial clerks it was one in 49; whereas, among commercial travellers, who are engaged in nearly similar pursuits, but comparatively lead a much more active life, and pass a great deal of their time in the open air, the rate appears as one in 64; thus showing the occupation of commercial travellers to be more salubrious than that of individuals confined in counting-houses and by sedentary employments.

While the deaths amongst schoolmasters reached so high as one in every 36, it was only one in every 72 music masters; that is, two teachers of youth in schools died against one who followed the more varied, less sedentary, and certainly much more agreeable duties of music-teaching. Of actors, lately, one in every 52 seems to have died; whereas, amongst musical performers, whose occupation is devoid of locomotion and much bodily exertion, the proportion of deaths was double, or less than one in every 25. The rate of mortality amongst annuitants ranged so low as only one in every 314, warranting the general inference of annuitants being long-livers, and that one of the best prescriptions to prolong human existence is the regular receipt of a cheque upon some bank, which will be always honoured.

Although the classes of persons to whom I am now about to refer are not strictly comprised amongst those engaged in mental occupations, still, as they do not live by bodily labour, and are otherwise interesting, while in several respects there prevails some resemblance in their respective conditions, a few remarks, illustrating the mortality met with in Chelsea and Greenwich pensioners, as also amongst the metropolitan police, will not be out of place. The two former are all old men, while the latter body is entirely composed of persons usually in the vigour of manhood. As might be expected, the mortality which residents of Greenwich Hospital reached was nearly one in twelve; whereas, at Chelsea, the ratio amongst old soldiers ranged at almost one in sixteen, or a third less than in veteran seamen, who are neither so healthy, nor generally attain such advanced ages as Chelsea pensioners. Throughout the metropolitan police, on the other hand, the deaths were reported at one in every 90.

This result is, however, not more singular than might be anticipated, considering the ages of policemen, and seeing they do not remain attached to their corps during their whole lifetime, as in the two former bodies of men; many of these having been also in foreign climates, exposed to various causes inimical to physical health, and have often grown grey-haired in the public service. These constitute very different considerations, and at once account for the large mortality invariably prevalent amongst Greenwich and Chelsea pensioners, notwithstanding that individual instances of great longevity are met with at both these establishments.

Another interesting feature characterised the public health of London; namely, the advanced ages attained by many individuals prior to decease. Thus, the deaths of 1,967 persons were recorded who had become 80 years old or upwards, or nearly one in every 30 of the total deaths. Of these, 117—comprising 83 females and 34 males—ranged from 90 to 106 at death. Amongst the 83 females, 54 died from 90 to 95; from that age to 98, 21; 4 succumbed in their 99th year; and four lived to 100. Of the 34 males who had attained 90 or more years, 29 died from that age to 95; at 96 there were two cases; one at 97; another at 99, while only one was reported a centenarian. The oldest person who died during 1856 in London—a female, aged 106—had resided in the Marylebone workhouse during the last 34 years; her son was then alive at the age of 84; which fact appears not only strong proof of her own very protracted age, but likewise an illustration of longevity being hereditary in her family.

It becomes an important inquiry to ascertain if long life be equally frequent in the French metropolis, especially as it constitutes the next most populous city of Europe, and therefore forms a very good basis for comparison. As it is not yet possible to specify the ages of those who died in Paris during 1856, reference must be made to 1855, when the deaths of only 15 persons—5 men and 10 women—whose ages ranged from 95 to 99 were recorded, none being a centenarian. However, to prove conclusively that very old age is not characteristic of Parisians, some curious data, collected during a visit paid to Paris last autumn, may be adduced. In the Bicêtre, which, besides containing about 1,000 male lunatics, is the great poor-house for the Seine department, and mustered 2,794 residents when I visited it in September 1856, the oldest living person was 97, while five were from 90 to 92 years of age; but I could hear nothing of any centenarian. At the Salpétrière, where all indigent aged females of Paris, besides

the pauper lunatics—about 1,200—are taken care of, and which contained 4,237 residents at the period of my inspection, there were only three inmates who had passed their 90th year, the most aged being then 93. This fact is conclusive, and shows the rarity of extreme ages amongst Parisian females, compared with the same class in similar London establishments, where several centenarians are now living. But still more convincing data, supporting such conclusion, may be mentioned. During the last twenty-five years, only one person residing at the Salpétrière has been classed as a centenarian; this occurred fourteen years ago, when a female died at the age of 104, according to the register of that institution. Again, at the Hôtel des Invalides, where the aggregate population usually exceeds 5,000 persons, the most aged veteran on the books was only 91, when the inquiry was made: whereas, at Chelsea hospital—the analogous public establishment in London—the oldest living individual now resident therein has attained his 103rd year. Besides these illustrations of the extreme terms of human life met with, it may also be added that, from all the inquiries made when in Paris, the oldest person actually known to any of my acquaintances was a gentleman reputed then to be 94 years old; and regarding the accuracy of which, little doubt existed in the mind of my informant.

Lastly, as additional evidence showing that fewer examples of very old people are met with in Paris than in London, attention should be directed to the ages recorded on the tombstones erected in its cemeteries. These were examined during my peregrinations last autumn; when few exhibited such high figures as are commonly seen on the banks of the Thames. In Père la Chaise, a large proportion of the death memorials indicated, by the figures inscribed, that the parties buried were by no means old, numbers being very young; several, indeed, ranged above 80, and some even 95 or upwards, but none were centenarians. At Mont Parnasse cemetery—also a very large burying-ground—the highest age noticed was 96, a female; one very remarkable exception, however, deserves especial mention. The monument now alluded to is in the upper or south alley, and bears this inscription,—"Eliza Béens, died December 1854, *in her 100th year*, beloved and respected by all who knew her." The words now copied, and their national characteristics, show unmistakably whence she came originally. Consequently, the only reputed centenarian, regarding whom, through recent grave-yard researches in Paris, authentic information could be obtained, was not a

native of the country where she had been interred, but in all probability, relying on the brief narrative just quoted, was an immigrant from the British Isles.

Amongst numerous very advanced ages often recorded in London cemeteries, the highest figures actually seen by me on any metropolitan gravestone, occur in the burying-ground of Christ Church, Broadway, Westminster. A square slab, fixed in the eastern wall of that enclosure, states, "Near this place lieth Margaret Patten, who died June 26th, 1739, in the parish workhouse, aged 136 years." Two other centenarians are also buried within the same precinct; one being a female, the other a male, named Man, who was 102 at death. But the oldest person believed to have ever lived in modern London, according to a list which I have collected of 208 reputed metropolitan centenarians—122 being females, and 86 males—was Thomas Carn, who is reported, in the Parish Register of St. Leonard's, Shoreditch, to have died on January 28th, 1588, at the marvellous age of 207 years! he having been born A.D. 1381, during Richard the Second's reign. If this statement be credible, Mr. Carn becomes the most remarkable instance of great longevity yet known in English history.

Reviewing the aggregate facts previously detailed, and every collateral circumstance, impartial observers are fully justified in considering that the French metropolis is neither so salubrious, nor contains the same proportion of patriarchal inhabitants as the capital of Great Britain, notwithstanding its enormous and over-crowded population, and although it is exposed to powerful artificial causes inimical to health. Speaking generally, while in London 22 of every 1000 persons annually fall victims of disease, upwards of 34 individuals are similarly cut off in Paris; or for every two deaths in the former city, three are recorded in the latter, if calculated according to their respective populations; while a smaller number attain very protracted terms of life, and more die in early youth. This latter observation is proved by the fact that the proportion of deaths in Paris, among young persons under five years of age, usually ranges from 48 to 49 per cent. of the total mortality; whereas the analogous ratio last year in London was only 40. On the other hand, in Glasgow, the ratio was 52.9 per cent.; and in Dundee above 55; thereby giving an excess of 15 per cent. in the latter town over the English metropolis. This becomes an important feature, when compared with the capitals of France and England, and shows that some great social evils must prevail in the two northern localities above designated, which need investigation and speedy amendment. Besides the cha-

racteristics which have just been mentioned respecting the British metropolis, a larger amount of persons, as previously stated, are there recognised who have lived beyond the ordinary term of human existence, than are found in any other populous district throughout Europe.

As additional evidence deserving record, and as the result of observations made during an extensive holiday tour recently made through Northern Germany, Sweden, and Denmark, I would mention, in reference to the longevity commonly characterising natives of these countries, that none of the lunatic asylums, workhouses, prisons, or other public institutions I then visited—and they were numerous—possessed residents who were actually 90 years old. In no monument in the churches or cemeteries, purposely inspected, did the age of any person so recorded exceed that period; while examples of centenarians were said to be exceedingly rare throughout. The only instance anywhere reported of that kind, is a woman now alive in a village about twenty miles from Stockholm, who, my informant said, had attained 101 years. Further, the oldest living individual I heard of in Denmark, was the mother of a distinguished medical practitioner of Copenhagen: she, as he told me in the course of conversation upon this subject, had then seen 95 summers, and enjoyed good bodily health.

ON SUMMER MOURNING FOR FEMALES.

By FREDERICK J. BROWN, M.D.

THE higher temperature of dark-coloured than of light-coloured clothes, when exposed to the rays of the sun, is a fact well known to the public. It is in consequence of the appreciation of this difference in the effects of colour, that we see so many persons dressed in light-coloured garments during the summer months. It is desirable that change of colour in articles of dress, according to season, should become the custom with men as well as with women, instead of being exceptional as it is at present. The black hat, with the black cloth clothes, cause men to experience distress that is wholly unnecessary. The unwritten laws of society are binding upon civilized men, but they must not be carried out to the extent of inflicting useless suffering. Men living in communities, however, do rightly submit to rules of conduct, and also to rules relating to dress. It is proper, therefore, to change the public customs rather than to liberate men from the control of public opinion.

It is common for the observation to be made by those that have returned from warm climates, that the heat in England, in the summer, is less patiently borne than it is in hot countries. This circumstance is due to the insufficient difference that is made betwixt winter and summer clothing, particularly as regards colour. The natives of hot countries commonly wear white or light-coloured articles of dress in the hot season, and they practise every method that is available to nullify the effects of solar heat upon their bodies; and Europeans on the continent follow their example to some extent. In England, on the contrary, great pains are taken to guard against the effects of cold; and the hot weather is considered by the public as something good because it is opposed to "cold."

The proper course to follow is to moderate the effects of cold in the winter, and of heat in the summer. It is well known that both cold and heat in excess are injurious to health.

The tables of mortality show an increase in the number of deaths from pulmonary affections when the thermometer falls in winter, and an augmentation in the mortality of diarrhœa when the temperature rises high in summer; and the increase corresponds accurately, allowing for disturbing causes, with the fall or rise of the thermometer respectively.

Women readily exchange their winter garments for those suitable to summer; but, under circumstances of mourning, they are cruelly compelled by custom to move about under a load of black crape. It is to liberate them from this misery that the present article is written.

Many widows suffer from nervous headache in consequence of night-watching, anxiety, and grief; and this form of headache is converted into congestion of the blood-vessels of the head by exposure to the sun in black bonnets and dresses. There are numerous instances of widows remaining within doors for months together, to the great injury of their health, rather than endure the misery of sun broiling.

The remedy is very simple.

Let summer mourning become customary. Let light-coloured clothing be worn, trimmed with thin black edging.

There is such an article as white crape; but it indicates slight mourning. Either white crape should be worn as summer mourning, or small-sized black edging to light-coloured dresses; and bonnets should be introduced into general use for the purpose.

The milliners can best manage the details: it is for physicians to point out the propriety of the change in custom.

Chatham, September 1857.

SANITARY AND SOCIAL SCIENCE.

REPORTS ON CITIES, TOWNS, & DISTRICTS.

REPORT ON THE SANITARY STATE OF TEIGNMOUTH.

By W. C. LAKE, M.R.C.S., M.B.M.S., Surgeon to the Teignmouth Dispensary.

TEIGNMOUTH is situated in lat. 50° 32′ N.; long. 3° 29′ W., at the mouth of the estuary of the Teign, and at the foot of a range of hills which extend nearly due W. and E. along its bank, reaching their highest elevation to the north of the town in the heathland of Haldon, and terminating in a precipitous line of cliffs on the sea coast; the declivity of the range being moulded into coombes or valleys opening out upon the river, and fronting on the opposite bank a range similar in character but of lower elevation. The sea coast itself trends in the direction of Dawlish N.N.E. The geological formation of the district is the new red sandstone, capped, as at Haldon, by the green sandstone.

Into the space occupied by the town open two valleys; that of Coombe, containing a stream of water of the same name, at its western extremity; that of Brimley, in which the Thame rivulet runs, into its eastern part. The rising ground between the two forms part of the general declivity. To the east of Brimley the ground rises towards the cliffs, interrupted only by another shallower depression. The mouth of Brimley itself opens out upon a large V-shaped flat of shingly sand and earth, which runs across the entrance into the estuary from its northern nearly to its southern side, and which, on the part fronting the sea, has been turfed, and forms an extensive promenade, called the Den. The town is built principally on the remaining portion of this flat, and on the rising ground between the vales, partly on the sides of the valleys themselves.

The width of the estuary opposite the town is about 650 yards. At low water several banks are exposed in its course. Those in the neighbourhood of the town are composed entirely of sand and shingle. The one nearest the town, of large size, and which begins to be uncovered soon after high water, is always fringed with fresh seaweed, and gives to this part of the estuary rather the character of an involution of the sea-shore.

No trustworthy observations, that I am aware of, had been made of the meteorology of Teignmouth previously to the spring of 1854; a sufficiency of time, therefore, has not elapsed to enable one to deduce its mean elements from those that have been taken since that date. The following table contains the means of the several observations during the two years com-

mencing with April 1854, and closing with March 1856. As this has been in many respects an exceptional period, I have subjoined, as far as I was able, similar tables, taken for the same time, and the means for Exeter and Torquay, using the Registrar General's Quarterly Report. (See next page.)

In any respect these tables have a merely approximative value.

The several parts of the town present more features of difference, with regard to climatic character, than might have been expected from its comparatively limited size. The part situated on the flat, and which contains a principal portion of the better class of houses for residents, and almost all the lodging houses, faces, generally speaking, S.E., and is a good deal exposed to easterly winds, though forming a delightful place of summer residence. The part on the rising ground between the vales faces nearly S., has the advantage of a more elevated situation than the first part, and is more sheltered by the hills rising to the north of the town, and which, at a distance of two miles from it, attain an elevation of from 500 to 600 feet. It is less exposed to the east wind, and is mostly occupied by houses belonging to the poorer classes, though containing also some of the better class of houses, and a few of the lodging houses. It is in this part of the town that the meteorological observations have been taken. The sides of the valleys, which combine the advantages of elevation to a greater or less degree, and, on one side at least, complete shelter from easterly winds, and are well fitted for a place of winter resort, are at present occupied by a comparatively small portion of the town, consisting chiefly of gentlemen's seats and villa residences, with a few of the houses of the labouring population. It is, however, in the direction of these valleys that the town is now extending.

The excavation of the South Devon Railway, which passes through the town, caused the destruction of many of the poorer class of houses. It not only threw a considerable temporary influx of labourers into the town, but since that time the poorer part of the population has seemed to exist in a higher ratio than formerly. As a consequence of this, and of the high price of land in the town, most of the unoccupied pieces of ground have been used for the erection of houses for the accommodation of the poor. These edifices are small in extent of ground surface, but make up in height and in the number of the rooms. If this plan of building were to continue, it would tend to interfere much with the due ventilation of the narrower streets, and in other ways to unfavourably affect them.

A year or two ago, a stack of model cottages, in three tiers, was built, each house being separate, and each having

TEIGNMOUTH.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Mean barometer	29·83	29·82	29·85	—	—	29·90	29·87	29·96	30·10	29·73	29·89	29·90
Mean maximum temperature .	44·1	42·9	46·6	55·0	58· 6	64·1	68·7	69·4	65·1	58·1	48·0	46·9
Mean minimum temperature .	37·0	33·8	36·3	41·1	44· 2	50·1	54·1	54·5	52·2	46·8	38·4	38·6
Mean temperature	40·2	38·1	40·5	46·8	49· 9	55·2	59·8	60·2	58·0	51·5	43·0	42·8
Mean humidity	88	85	82	73	77	80	83	79	81	83	83	84
Mean total rain	2·2	2·8	2·3	0·3	2· 8	2·4	2·2	0·9	0·6	3·5	1·3	1·6
Mean ozone (Schonbein) . .	4·9	5·2	3·8	4·5	5· 3	4·6	2·8	2·6	3.1	4·4	3·6	5·0
Mean daily range	7·1	9·1	10·3	13·9	14· 4	14·0	14·6	14·9	12·9	11·3	9·6	8·3

EXETER.

Mean barometer	29·74	29·78	29·77	—	—	29·82	—	—	—	29·63	29·84	29·82
Mean maximum temperature .	45·4	44·3	49·3	59·1	60· 3	65·5	—	—	—	59·1	50·4	47·7
Mean minimum temperature .	35·3	32·5	34·9	39·7	43· 8	49 8	—	—	—	44·8	36·4	36·3
Mean temperature	40·1	38·3	41·0	48·5	51· 0	56·0	—	—	—	51·5	43·0	42·4
Mean humidity	86	85	83	71	74	78	—	—	—	84	84	85
Mean total rain	2·5	2·4	2·0	0·5	2· 4	3·0	—	—	—	3·2	1·3	1·9
Mean daily range	10·1	11·8	14·4	19·4	16· 5	15·7	—	—	—	14·3	14·0	11·4

TORQUAY.

Mean barometer	—	—	—	—	—	—	—	—	—	—	—	—
Mean maximum temperature .	44·3	42·5	45·8	56·4	56·7	61·3	—	—	—	57·2	47·8	46·8
Mean minimum temperature .	37·4	36·2	38·1	42·4	44·8	48·0	—	—	—	47·9	40·2	39·5
Mean temperature	41·0	39·1	41·3	47·9	49·2	53·2	—	—	—	52·3	43·7	42·9
Mean humidity	81	85	81	63?	70?	79	—	—	—	80	80	85
Mean total rain	1·7	1·6	1·8	—	—	—	—	—	—	3·1	2·1	1·8
Mean daily range	6·9	6·3	7·7	14·0	11·9	13·3	—	—	—	9·3	7·6	7·3

attached every necessary convenience, and with larger rooms than in the generality of the poorer houses; the whole being well drained and situated in a high and open part of the town. If one may judge from the short period of time that has elapsed since their erection, they may be spoken of most favourably, both in regard to the comfort and the health of their occupiers.

By an Act of Parliament, obtained in 1836, the power of lighting, watching, draining, and otherwise generally improving the town, was vested in the hands of commissioners elected from amongst the ratepayers. By means of this body, streets have been widened and otherwise improved, a police has been established, and the town has been lighted with gas and supplied with water. Before this time the water supply of the inhabitants had been obtained from wells and the Coombe and Brimley brooks; it is now almost entirely supplied by means of a reservoir situate in the Coombe valley, at a higher elevation than the major part of the town, and fed by the Coombe brook, the water being taken from it near its source on the side of Haldon. A few only of the private wells remain.

The declivity on which a great part of the town is built offers great advantages for draining, while the surface water rapidly passes off; from the higher parts, owing to the great fall; from the lower, on account of the porous nature of the soil. Teignmouth cannot, however, boast of an efficient sewerage. Much has been done from time to time by the commissioners, in covering open drains and forming new ones, but most of the old drains are small and imperfectly constructed, and the increased number of houses in the streets has rendered them still further inefficient. Some of the streets would even appear to be wanting in public drains to a great extent, if not altogether; while the main sewer, consisting of the Thame rivulet, arched over in its passage through the town, and emptying itself into the river, is uncovered nearly through its whole extent between high and low-water mark, and, assisted by some smaller drains, which are similarly circumstanced, is, especially in certain winds, a most serious annoyance to all the houses in its vicinity.

A few years ago a plan for the extinction of these nuisances, and for the effectual drainage of the town, was laid before the commissioners, and met with their approval at the time. Measures have lately been taken for covering in the principal sewer as far as the low-water mark. It is to be hoped that this step will be followed by others in the same direction, and that the ratepayers will be disposed to vote a sufficient supply of money for the purpose.

When the cholera last invaded England, a temporary local Board of Health was instituted to make a house by house visitation; to examine into the existence of nuisances; and to take steps for their removal. An opportunity was thus afforded for seeing the condition of the generality of houses in their separate drainage arrangements. On the whole, this may be said to be satisfactory. Cesspools have been interdicted, and the use of pans, with syphon tubes, as far as possible enforced.

The population of Teignmouth, at the last census, was a little over 5000. It is, besides being a place of general residence, a watering-place and a sea-port. The labouring population are probably pretty equally divided amongst field labourers, artificers, and those engaged in the various handicraft employments, and seamen, fishermen, and those concerned about the shipping and the river trade. It may, I think, be doubted whether, except in certain cases, there is much absolute poverty in the town, such at least as exists in larger places. Idleness, mismanagement, and improvidence, are, I fear, more often the cause of temporary want, than real inability to acquire a sufficient maintenance by the labour of the hands.

The two parishes of East and West Teignmouth are separated by the Thame brook, which, being covered over in its passage through the town, does not form a line of demarcation recognisable by the eye; and, indeed, in a few instances, part of a house is in one parish, part in the other. The burial grounds of both parish churches, and of nearly all the dissenting places of worship, have been lately closed by an order in council, and a cemetery, prettily situated, has been formed, under the "Burials beyond the Metropolis Act," to the north, and at the distance of about three-quarters of a mile from the town.

Teignmouth has the reputation of being a very healthy place, and I believe justly, not merely from the longevity and hale old age of many of its inhabitants, but from the comparatively unfrequent occurrence of epidemics, and their usual mildness when they do occur. Small-pox has not visited the town since the autumn of 1852, and then only transiently. Scarlatina showed itself in the autumn of 1853, and cases since occurred till the spring of 1856, for the most part mild in character, a few only having a fatal termination. Of cholera three cases alone are said to have occurred, all in old women, during the epidemic of 1832.

The type which fever assumes here may be denominated gastro-bilious. It has in the main similar characteristics in children and in adults, except that in the former a tendency to remission is prominently marked; in the latter, this is less

prominent and occurs less frequently. The symptoms of a normal attack are the usual symptoms of pyrexia, accompanied with some epigastric pain and tenderness, nausea, and frequently vomiting, the skin being more or less tinged with bile, and the motions dark coloured and offensive, at times almost black; the febrile symptoms lasting for a period varying between eight or ten days and two or three weeks, when the tongue cleans, and the appetite and strength return. Cases of this fever occur usually in the course of every year, more commonly amongst children. Its occurrence in separate cases seems to be more dependent on meteorological causes, or on constitutional or possibly miasmatic conditions, than on contagion. A fatal termination is very rare. Rheumatic fever is not common.

Pneumonia is not common; and idiopathic pleurisy is of great rarity. Phthisis also is by no means of common occurrence amongst the resident population.

The class of disorders to which there appears to be the greatest proclivity, are those connected with derangement of the chylopoietic viscera, the whole group of bilious and stomach complaints.

I regret that I have not yet been able to obtain any information with regard to the average yearly proportion of deaths.

The general healthiness of the town is not very easily accounted for. Its sanitary arrangements are not apparently superior to those of neighbouring towns; yet, while several of these have, during the past two or three years, been the subjects of severe epidemics, Teignmouth has either escaped altogether, or has suffered from the same complaints in a mild form. These disorders do of course at times occur of a formidable type, but certainly not commonly, nor so frequently as in some other places. The immunity from small-pox for the last four years, is no doubt partly owing to the attention paid to public vaccination, and to the tolerable readiness with which it is had recourse to by the poor. Here, at least, the Compulsory Vaccination Act has worked well, not from its compulsory clauses having been put in force, but from the people becoming habituated to regard the operation as a thing which is required to be performed, and from the knowledge of the existence of compulsory clauses affording the necessary stimulus to some, who would otherwise allow their prejudices to prevail.

Perhaps much of the salubrity of the town is owing to its position, the sea being in front, the pure air of Haldon descending on it from behind, while the interchange of easterly and westerly winds causes a continual current over the town, from the sea in the direction of the river, and from Dartmoor down the river towards the sea. Were sanitary improvements more

fully carried out, and their continuance enforced, Teignmouth would probably yield to few towns of its size, in the general healthiness of its inhabitants, and its freedom from fatal disease.

MISCELLANEA.

M'KINNELL'S VENTILATOR.

WE have, on repeated occasions, laid before the readers of this REVIEW the particulars of the various plans invented by different authors for securing an efficient ventilation. At the same time we have generally opposed all modes of ventilation except the simple, natural system.

During the past quarter Mr. M'Kinnell, of Glasgow, has brought before us, in the way of direct experiment, his system of ventilation. And we are bound to record the entire success of his demonstration in so far as such demonstration was practicable on a small scale. The plan is described as follows in Professor Nicol's *Cyclopædia of the Physical Sciences.*

"The method adverted to is founded on the circumstance that *one* tube, provided it be sufficiently capacious, may serve, at one and the same instant, for abduction and induction, the centre being occupied by a column of warm outgoing air, while, towards the circumference, a stream of cold air is rushing inwards. Although a partial knowledge of the fact of counter currents taking place in a single opening was possessed by the earlier writers on ventilation, Mr. M'Kinnell, of Glasgow, was the first, it is believed, to discover, and draw attention to this unvariable arrangement of aerial currents in the circumstances described. Openings of sufficient capacity, however, to admit of the unimpeded movements of these currents, would, in the climate of Britain, be intolerable. But on investigation, it was found that the same effects could be obtained in smaller space, by relieving the ascending and descending currents from mutual contact. Mr. M'Kinnell's patent ventilator is constructed on these principles. It consists mainly of two tubes arranged concentrically, the inner discharging the vitiated air, while the fresh supply flows down the outer tube. It is almost automatic in its action, requiring little or no attention in ordinary circumstances. It removes the air as it is vitiated, and supplies its place with pure air, in the exact amount required, in currents so gentle as scarcely to be perceptible. The contrivance also possesses this great advantage, that it can be introduced, and acts as effectively, between the ceiling and floor of the lower stories of buildings, as in apartments having immediate access."

The following diagrams illustrate the plan more strikingly.

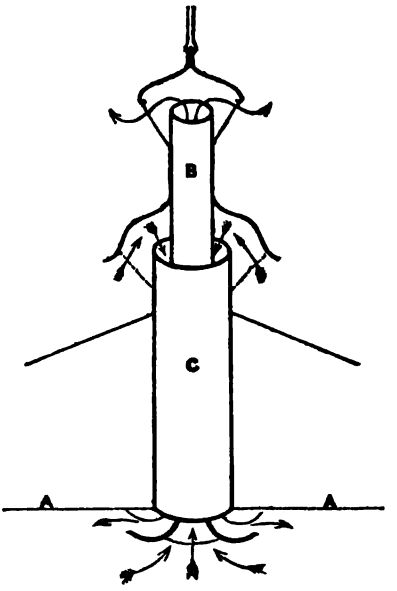

Fig. 1.

Fig. 1. General view of the arrangement and particular combination of the tubes. B and C. Two tubes arranged concentrically and opening into the interior of an apartment at the line of ceiling A. A. A. They are represented also as opening outwards, by the roof of the house, in a vertical direction. The inner tube *invariably* discharges the vitiated air, while the fresh supply of air *invariably* flows down the outer tube, as indicated by the arrows. Fig. 2. A horizontal or an oblique direction may be given to one or other or both of the concentric tubes, so that the apparatus can be introduced and acts as effectively, between the ceiling and floors of the lower stories of buildings, as in apartments which have access to the roof.

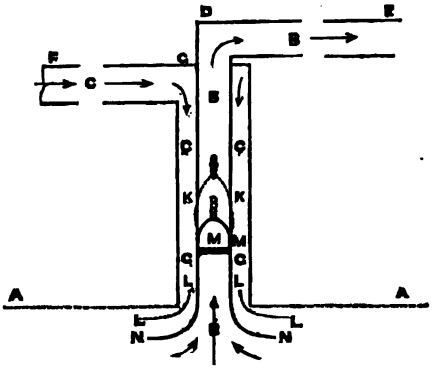

Fig 2.

A portion of the inner tube, M. L. N., at the end towards the ceiling, is so adjusted that it slides up or down by a telescopic motion, so that when drawn up its trumpet - shaped end takes up the position indicated by the dotted lines K. L. L. (fig. 2) and so closes completely, or partially, the aperture which admits the fresh air. The trumpet-shaped form of the tube which conveys the out-going current, deflects the currents of fresh air which are passing down through the circumferential space of the larger tube C, so that the force of the descending current is broken, and

is made to spread out into the space to be ventilated; the trumpet expansion also serves to collect and guide the outgoing currents which pass up through the central tube. An ornamental moulding may be applied to this opening; and thus may make a beautiful centre-piece in the ceiling of a room. The double transverse lines between K and L indicate the position of a diaphragm.

Independently of all theoretical argument, we consider M'Kinnell's system as well worthy of extensive application. It is simple; it aims at approaching a natural law; and with its good properties it certainly blends no evil ones, which is saying an immense deal for a ventilator.

CITY DWELLINGS FOR THE WORKING CLASSES.

Mr. Ross, in the Court of Common Council of the City of London, has been conducting an able argument on the best mode of providing dwellings for the working classes.

Mr. Ross shows with great force and exactness that the poor population of London is increasing, and that the idea of securing suburban villages for these poor classes is hopeless. He proposes, therefore, the erection of suitable buildings in the City itself. Calculating on the scheme of the metropolitan association, he finds that 20,000 persons could be accommodated on eight acres of ground. According to his plan, on proportionately less space, or about six and a half acres, and allowing as much space for yards as would be occupied with buildings, thirteen acres would suffice to house this large number of persons. The City contains 640 acres. Surely 13 of these could be, and ought to be, spared to provide houses for its working people.

Was ever argument more impressive or simple? Yet imagine that in the assembly where it was spoken the speaker stood almost alone in the cause, the one representative there of scientific philanthropy. We shall return to this subject. Meantime we need not urge Mr. Ross to push on in his labours; he grasps the work, understands the delay, and sees the reward.

PROPOSAL FOR A LONDON FEMALE SANITARY SOCIETY AND SAVINGS' BANK.

Mr. Acton favours us with the outline of a scheme for extending the advantages of Friendly Societies and Benefit Clubs to the unfortunates of society. That some great remedial work is wanted in this direction there is no doubt, and we admire Mr. Acton's courage in speaking out so boldly as he has done. But we reserve for future consideration any opinion as to the merits of his suggestion.

PROGRESS OF EPIDEMICS.

LOCAL REPORTS OF EPIDEMIC AND ENDEMIC DISEASES

During the Months of June, July, and August, 1857.

Place.	County.	Lat.	Long.	Observer.
St.Mary, Scilly	Cornwall -	49.50 N.	6.24 W.	J. G. Moyle, Esq.
Teignmouth -	Devonshire -	50.32 N.	3.29 W.	W. C. Lake, Esq.
Odiham - -	Hampshire -	51. 8 N.	1. 3 W.	J. McIntyre, M.D.
Canterbury -	Kent - -	51.17 N.	1. 4 E.	G. Rigden, Esq. W. Haffenden, Esq.
Chatham -	Kent - -	51.21 N.	0.14 E.	F. J. Brown, M.D.
Wandsworth -	Surrey - -	51.28 N.	0. 7 W.	G. E. Nicholas, Esq.
Putney - -	Surrey - -	51.28 N.	0. 8 W.	R. H. Whiteman, Esq.
Up. Holloway	Middlesex -	51.32 N.	0.03 E.	W. B. Kesteven, Esq.
Wanstead -	Essex - -	51.32 N.	0. 2 W.	F. Collins, M.D.
Swansea -	Glamorgansh.	51.38 N.	3.50 W.	W. H. Michael, Esq.
Aspley Guise -	Bedfordshire -	52. 1 N.	0.37 W.	J. Williams, M.D.
Saffron Walden	Essex - -	52. 3 N.	0.12 E.	H. Stear, Esq.
Bedford - -	Bedfordshire -	52. 8 N.	0.51 W.	T. H. Barker, M.D.
Newpt.Pagnell	Buckinghams.	52.10 N.	0.42 W.	G. O. Rogers, Esq.
Sharnbrook -	Bedfordshire -	52.12 N.	0.40 W.	R. S. Stedman, Esq.
Wellingbro' -	Northamptons.	52.20 N.	0.40 W.	B. Dulley, Esq.
Beccles - -	Suffolk - -	52.25 N.	1.48 E.	W. E. Crowfoot, Esq.
Thetford -	Norfolk - -	52.26 N.	0.45 E.	H. W. Bailey, Esq.
Stourbridge -	Worcestersh. -	52.28 N.	2.32 W.	A. Freer, Esq.
Dudley - -	Staffordshire -	52.30 N.	2.10 W.	J. H. Houghton, Esq.
Barrowden -	Rutland -	52.34 N.	0.38 W.	H. J. Swann, Esq.
Wisbeach -	Cambridgesh.	52.39 N.	0. 5 E.	W. H. Hole, Esq.
East Dereham	Norfolk - -	52.40 N.	0.57 E.	J. Vincent, M.D.
Pontesbury -	Shropshire -	52.43 N.	2.50 W.	Wm. Eddowes, Esq.
Nottingham -	Nottinghamsh.	52.50 N.	1.10 W.	T. Robertson, M.D.
Burton-on-Trt.	Staffordshire -	52.53 N.	1.53 W.	S. Thomson, M.D.
Oswestry -	Shropshire -	52.53 N.	2.59 W.	P. Cartwright, Esq.
Wrexham -	Denbighshire -	53. 2 N.	3. 1 W.	E. Williams, M.D.
Hawarden -	Flintshire -	53.11 N.	3. 2 W.	T. Moffat, M.D.
Lincoln - -	Lincolnshire -	53.12 N.	0. 5 W.	S. Lowe, Esq.
Alford - -	Lincolnshire -	53.15 N.	0. 6 E.	R. U. West, M.D.
Gainsborough	Lincolnshire -	53.23 N.	0.47 W.	D. Mackinder, M.D.
Liverpool -	Lancashire -	53.24 N.	2.59 W.	Thos. Bickerton, Esq.
Warrington -	Lancashire -	53.25 N.	2.32 W.	C. N. Spinks, Esq.
Wigan - -	Lancashire -	53.32 N.	2.33 W.	Jephtha Hussey, Esq.
Bolton - -	Lancashire -	53.35 N.	2.19 W.	W. H. Pendlebury, Esq.
Bramley -	Yorkshire -	53.49 N.	1.38 W.	J. N. Radcliffe, Esq.
York - -	Yorkshire -	53.58 N.	1. 3 W.	W. Procter, Esq.
Wst. Auckland	Durham -	54.45 N.	1.40 W.	G. Todd, Esq.
Rothbury -	Northumberld.	55.25 N.	1.50 W.	E. C. Summers, Esq.
Lerwick -	Shetland Isles	60. 9 N.	1. 8 W.	G. W. Spence, M.D.

QUARTERLY STATEMENT—No. XI.

[*The dates denote that the disease appeared in the weeks then ending.*]

SCARLET FEVER.

Odiham—August 21-28
Canterbury—All July and August
Newport Pagnell—June 19, July 10
Beccles—August 21-28
Stourbridge—July 3
Dudley—June 5, 19, July 3, Aug. 7-14
Wisbeach—August 14-28
East Dereham—All August
Pontesbury—July 24-31
Burton-on-Trent—All June and July,
Hawarden—July 4-11, Aug. 1 [Aug. 7

Lincoln—July 24-31
Gainsborough—July 17-31, all Aug.
Liverpool—Every week
Warrington—All June, July 3-17, Aug.
Wigan—July 10 [14-28
Bolton-le-Moors—June 5-19, July 10-
Bramley—July 3 [31, Aug. 14-21
York—July 10-24, August 7-21
West Auckland—All July and August

MEASLES.

Odiham—August 14-21
Stourbridge—June 12
Dudley—June 5-12, July 10-24
Barrowden—July 24, August 7
Pontesbury—June 5, all August
Burton-on-Trent—August 28
Wrexham—June 12-26, July 3-10
Lincoln—All June, July 3
Gainsborough—All June, July 3-17
Liverpool—Every week
Warrington—All June & July, Aug. 7-14
Bolton-le-Moors—June 12-19, July 17-31, August 7-14
York—June 12-26, July 3, 17, Aug. 7-14
Lerwick—All June, July 3

SMALL-POX.

Chatham—August 14-28
Swansea—July 17, August 7-14
Thetford—June 5, 19-26, July 3-17
Stourbridge—Every week
Dudley—June 5-12, 26, July 17-31, Aug.
Wisbeach—July 10-31, Aug. 7 [14-28
East Dereham—All June
Pontesbury—All June, July 3-10
Oswestry—All June & July, August 7
Wrexham—June 12-26, July 3-10
Lincoln—July 17-24
Liverpool—Every week
Warrington—July 10-17, 31, August 7
Wigan—June 19, July 17, August 7
Bolton-le-Moors—June 5-19, July 24-31, August 7-14
York—June 12-26, July 10-24, Aug. 7-14

HOOPING-COUGH.

Chatham—July 3-17, August 14-28
Upper Holloway—July 17-31, Aug. 7
Swansea—June 12-19, August 14-28
Saffron Walden—June 19
Bedford—July 10-31, August 7-14
Newport Pagnell—June 5-12, July 24-31, August 7-21
Sharnbrook—Every week
Stourbridge—June 12, 26, July 17-31
Dudley—June 12, July 10, August 21
Barrowden—June 19
Wisbeach—June 5-19, August 21-28
Pontesbury—Every week
Burton-on-Trent—All July & August
Oswestry—Every week
Lincoln—June 5-19
Gainsborough—July 31, August 7
Liverpool—Every week
Warrington—Every week
Wigan—June 5-19, July 3, 24
Bolton-le-Moors—June 19-26, August
Bramley—June 5 [14-28
York—June 19, July 17

CROUP.

Canterbury—June 19
Chatham—July 3
Swansea—July 17
Thetford—June 26, July 10, 31
Stourbridge—July 17
Dudley—July 24
Oswestry—June 5-12, July 17
Lincoln—June 26, July 3-17
Liverpool—June 12, July 17
Warrington—June 19
Wigan—July 17, August 14
Bolton-le-Moors—July 17-24, Aug. 28
Rothbury—July 3

CATARRH.

Teignmouth—June 5-12, 26, July 3-10, 31 [Aug. 14-28
Odiham—June 5-12, July 10-17, 31,
Chatham—June 26, July 3-17 August 7-21
Wandsworth—June 5-12, July 3, 24-31
Putney—June 5-19
Upper Holloway—July 3-24
Swansea—June 19-26, July 17-31, all
Saffron Walden—July 3-10 [Aug.
Sharnbrook—June 19-26, all July, Aug. 7-14, 28
Wellingborough—June 5, 19, all Aug.
Beccles—June 12, 26, July 24-31
Thetford—June 5, 19-26, July 3, 24, August 7, 31
Stourbridge—June 19, July 31 all Aug.
Dudley—June 12, July 14
Wisbeach—July 17-24
Pontesbury—July 24-31
Burton-on-Trent—All August
Gainsborough—July 24-31, all Aug.
Liverpool—Every week
Bolton-le-Moors—June 12-19, July 3-
Bramley—June 12 [24
Rothbury—July 17
Lerwick—June 5-19, July 3-10, Aug. 7

INFLUENZA.

Scilly Islands—June 5-19
Teignmouth—June 5-19
Chatham—July 3, 31
Swansea—June 26, August 14
Saffron Walden—July 24
Newport Pagnell—All June and July, August 21-28
Beccles—June 5, July 3-10
Thetford—June 12-19, July 3-10, 24, August 7-14

Pontesbury—June 5-12, August 21-28
Lincoln—July 24-31, August 7
Liverpool—All June, July 3-10, 31, August 7-14, 28
Bolton-le-Moors—June 26, July 3
York—August 14-21

ERYSIPELAS.

Canterbury—July 10, 24, August 21
Chatham—July 3, 17-24, August 7
Wandsworth—June 5, July 3, 31
Swansea—June 19-26, July 31, Aug. 7
Bedford—August 21-28
Newport Pagnell—July 31, all August
Sharnbrook—August 21
Beccles—July 17, August 7
Thetford—June 5, August 21
Dudley—June 19, July 3-10, Aug. 21
Barrowden—July 31
Wisbeach—June 12-26
Pontesbury—July 3-10, all August
Burton-on-Trent—June 19, July 31
Oswestry—All August
Alford—June 26, July 31
Gainsborough—All July and August
Liverpool—Every week
Warrington—July 17-24
Bolton-le-Moors—June 19-26, July
Bramley—June 5-12 [17-24
York—June 12, July 31
West Auckland—July 31, all August

CHOLERA (ENGLISH).

Odiham—All August
Chatham—July 31, August 7
Putney—August 14-21
Swansea—August 21-28
Newport Pagnell—August 7-14
Wellingborough—August 14-28
Thetford—August 21-28
Stourbridge—August 28
Barrowden—July 24, August 21
Pontesbury—July 31, August 7-21
Liverpool—June 5, 19 26, July 3, 17, 31, August 14-28
Bolton-le-Moors—Every week
Lerwick—July 17

AGUE.

Canterbury—All June & July, Aug. 28
Chatham—June 5, 19-26 all July & Aug.
Putney—July 10
Wanstead—June 26
Aspley Guise—June 5-12
Bedford—June 5-26, July 3, 10
Thetford—June 5, 19, July 10, 31
Dudley—June 5
Barrowden—June 19
Wisbeach—Every week
East Dereham—All July, August 7
Lincoln—July 31, August 7-14
Alford—June 19, July 17
Liverpool—All August

REMITTENT FEVER.

Teignmouth—June 19-26, July 10, 24-
Odiham—July 3 [31, Aug. 14-28
Canterbury—June 12, 26, July 17, 31,
Chatham—June 5, July 10 [Aug. 14-28
Putney—June 5, July 10
Newport Pagnell—July 3-24 [7-21
Beccles—June 19-26, July 3-10, Aug.
Thetford—June 19-26
Wisbeach—All June and July, Aug. 7
Burton-on-Trent—July 17, Aug. 28
Oswestry—All July and August
Lincoln—July 10-31
Alford—July 17, August 14-28
Liverpool—All August [28
Wigan—June 12-26, July 17-24, Aug. 7,
Bolton-le-Moors—July 10-24, Aug. 7-14

DIARRHŒA.

St. Mary's, Scilly—July 17-31, Aug. 7-14
Teignmouth—June 12-26, July 3-10, 24-31, August 7-14, 28
Odiham—June 26, all July and Aug.
Canterbury—Every wk. except Aug. 28
Chatham—June 19-26, all July & Aug.
Wandsworth—Every week
Putney—June 5, 26, all July and Aug.
Upper Holloway—July 10-31, all Aug,
Wanstead—June 26, all July and Aug.
Aspley Guise—July 17, 31, all August
Swansea—June 12-26, all July & Aug.
Saffron Walden—June 12, all July & Aug.
Bedford—June 26, all July & August
Newport Pagnell—All July & August
Sharnbrook—July 24-31, all August
Wellingborough—July 17-31, all Aug.
Beccles—June 5-12, all July & Aug.
Thetford—June 26, July 10, 24-31, all August [Aug.
Stourbridge—June 19-26, July 17-31, all
Dudley—June 5-19, all July and Aug.
Barrowden—June 26, July 10-31, all August
Wisbeach—June 5, 26, all July & Aug.
East Dercham—Every week
Pontesbury—June 12-26, all July & Aug.
Burton-on-Trent—Every week
Oswestry—All August
Wrexham—July 24-31, all August
Hawarden—June 5-12, July 3, 17-31, August 7, 21-28
Lincoln—July 24-31, August 7-21
Alford—June 12-19, all August
Gainsborough—July 31, all August
Liverpool—All August
Warrington—All July and August
Wigan—June 19-26, July 3, 17-31, Aug.
Bolton-le-Moors—Every week [7, 21
Bramley—June 19-26, July 17, Aug. 21-
York—Every week except last [28
West Auckland—All July and August

Rothbury—All July, August 7
Lerwick—July 17-24, August 7, 28

DYSENTERY.

St. Mary's, Scilly—August 21
Odiham—July 3, 31, August 14
Canterbury—July 24, August 14
Chatham—July 17, 31, August 14-21
Wandsworth—June 5-19, July 10-17,
Putney—June 5 [Aug. 21-28
Upper Holloway—July 31, August 7
Swansea—July 24, August 14-28
Bedford—July 17-31
Newport Pagnell—July 10-17, all Aug.
Wellingborough—August 7, 21
Stourbridge—August 7-14
Wrexham—July 24-31, August 7
Lincoln—July 31, August 7-21
Alford—August 14-28
Gainsborough—August 14-28
Liverpool—Every week
Bolton-le-Moors—June 5-12, July 3-17, 31, all August
Bramley—June 12, 26, July 17, Aug. 14
York—July 3, 17-24, August 7-21

TYPHUS.

Teignmouth—June 26, July 10, 24, August 7
Canterbury—Every week except last
Chatham—June 5, 19-26, all July, August 7-14, 28
Wandsworth—June 19-26, July 3, 17-24,
Putney—June 5, 26 [Aug. 7-14
Saffron Walden—July 3
Bedford—August 14 28
Newport Pagnell—July 31, Aug. 7-14
Sharnbrook—August 7
Wellingborough—Every week
Beccles—July 10-31, August 21-28
Thetford—June 19, July 3-10, 24, Aug. 21-28
Dudley—All June, July 3-24, all Aug.
Wisbeach—July 17-31, all Aug.
East Dereham—August 21-28
Wrexham—June 12-26, August 21-28
Lincoln—July 17 31, August 7-21
Alford—August 21
Gainsborough—June 19-26, all July,
Liverpool—Every week [Aug. 7-21
Bolton-le-Moors—June 19-26, Aug. 14-
Lerwick—June 12 [21

PUERPERAL FEVER.

Chatham—July 24, August 14
Bolton-le-Moors—June 19-26, July 3-
York—August 21 [24

CARBUNCLE.

Canterbury—June 5
Swansea—All August
Saffron Walden—July 3, 24
Bedford—August 14
Newport Pagnell—July 10-17, Aug. 7-
Wellingborough—Aug. 21-28 [14
Beccles—June 19
Thetford—July 10
Stourbridge—June 19
Wisbeach—July 3-24
East Dereham—August 21-28
Oswestry—August 14-28
Wrexham—July 10-31
Alford—August 14
Gainsborough—July 10-31
Liverpool—June 5, July 17-24
Bolton-le-Moors—July 17-24
Rothbury—July 3

CHICKEN POX.

Wandsworth—July 17, August 21
Lerwick—June 19, July 31

MUMPS.

Lerwick—June 12

WHITLOW.

Lerwick—June 12-10

TYPHOID FEVER.

Stourbridge—June 12, July 3-10, Aug.
Wigan—July 17-24 [28

RHEUMATISM.

Hawarden—June 26

ADDITIONAL OBSERVATIONS.

St. Mary's, Scilly.—Mr. Moyle writes: "We have had a very healthy quarter: a few cases of influenza occurred in June, of diarrhœa in July and August, and one case of dysentery. Ozone has been daily indicated. It has never reached beyond 9 of Schonbein's scale; nor has it been less than 4. The temperature has been remarkably high for these islands, and the weather generally exceedingly fine."

Teignmouth. A remarkable feature in the meteorology of the quarter was the small amount of rain and the high temperature, from about June 18 till the end of the quarter. The temperature for the three months was as follows:

	June.	*July.*	*August.*
	Deg.	Deg.	Deg.
Highest temperature	75·4	80·0	81·0
Lowest temperature	44·0	51·1	47·5
Mean of all highests	68·7	71·9	72·9
Mean of all lowests.....	52·8	55·7	57·2
Total amount of rain in inches....	1·152	1·119	0·225

The quarter was decidedly healthy on the whole. Cases of diarrhœa were few in number, increasing more towards the close of August, but then not to any great extent.

Odiham.—Dr. M'Intyre says that the scarlet fever was *imported* from London. The choleraic condition was in some cases severe, but in none fatal. Diarrhœa was general, and was markedly prevalent during increased atmospheric temperature.

Canterbury.—Mr. Rigden writes: "Diarrhœa was very prevalent, particularly during the last six weeks, in this city and neighbourhood; but although seven deaths, in a population of nearly nineteen thousand inhabitants, have resulted from this disease, it has not assumed a malignant type. Four of the deaths were in young children under eighteen months; the three others were aged, respectively, 84, 63, and 25. The latter is registered simply as 'diarrhœa, 1 day', and occurred in a locality of medium sanitary conditions. Two deaths, during the quarter, have been caused by diphtheritis in children, aged respectively 9 years and 4 years, members of the same family, who resided in a very close and unhealthy locality. Seven deaths, from fever, in persons aged respectively 51, 18, 9, 79, 5, 7, and 8. Two deaths from scarlatina occurred in children aged respectively 7 and 3 years; one, from thrush, in a child aged 6 weeks; and one from purpura hæmorrhagica, in a child aged 17 months. Diphtheritis was very prevalent, and malignant, in a village about nine miles from this city. It has been difficult to account for it, unless upon the supposition of defective drainage, or the consumption of water impregnated with deleterious matters."

Mr. Haffenden furnishes the subjoined returns, drawn up by eight observers of the Epidemiological Committee of the East Kent and Canterbury Medical Society:

Abstract of the returns of Zymotic diseases during the Summer Quarter, 1857.

"The number of cases returned during the last three months amounted to two hundred and fifty-five, about one half of which come under the head of diarrhœa; and by far the greater number of these occurred during the last month. Six deaths were registered, during the quarter, from zymotic diseases; viz.,

two from diarrhœa, three from fever, and one from typhus. Of scarlatina, twenty-three cases were returned, all of which recovered. It is reported as being mild in character. A few cases of suppurating glands in the neck were mentioned in conjunction with scarlatina; and, in a few instances, anasarca. Measles and chicken-pox were observed, in a few instances, in the months of June and July but quite disappeared during the last month. Diarrhœa was very prevalent during August; but was not much noticed in the early part of the summer. One hundred and thirty-three cases have been returned, independently of a great number that were treated, at the hospital, in a casual way. In two instances it proved fatal,—one from exhaustion; and in the other, a child 13 months of age, the disease was said to put on the choleraic form. Of fever, fifty-six cases were reported: a few of them were remittent, the rest continued. Three terminated fatally, one of them being complicated with cerebral affection. Ague, which was very prevalent in the spring quarter, seems almost to have disappeared for a time. Eight cases were reported in the month of June, the greater number of them being of the tertian type. Only one case was noticed during the last two months. Of typhus only one case was returned, and that proved fatal. Of erysipelas, about the average number of cases appeared. It was generally of a mild character. The furunculoid diseases were rather more common than usual. Some very severe carbuncles were noticed."

Abstract of Meteorological Observations for the Summer Quarter, 1857.

	June. Deg.	*July.* Deg.	*August.* Deg.
Highest temperature in the day time	75	76	76
Lowest	57	58	51
Mean	64·96	66·32	63·12
Highest temperature at night	63	—	65
Lowest	40	—	50
Mean	52·5	—	56·41
Highest reading of barometer	30·26	30·23	30·20
Lowest	29·55	29·61	29·64
Mean	29·925	29·884	29·910
Number of days on which rain fell	9	9	12
Amount of rain in inches	1·16	1·18	2·23

Direction of wind (the number indicates the number of days certain winds prevailed). *June*—N. 6, NE. 3, E. 8, S. 3, SW. 6, W. 4. *July*—N. 1, NE. 3, S. 1, SW. 13, W. 9, NW. 4. *August*—N. 5, NE. 3, E. 5, SE. 2, S. 2, SW. 7, W. 5, NW. 2.

Chatham.—Dr. Brown says: "The diarrhœa cases were abundant during the period embraced in this report. The cholera cases were not severe. Typhoid fever continued to be prevalent, but the mortality diminished in its ratio to the

number of seizures. The fever continued to be marked by cephalic complications and by hæmorrhages, epistaxis, and intestinal bleeding. Sequelæ were common, and ague attacked many of the convalescents. There was a marked absence of scarlatina and measles, and no epidemic of influenza. Ague, in all its forms, continued to prevail. Two cases ended fatally in the last week of August, one by coma, the other by quasi-delirium tremens."

Wandsworth.—Mr. Nicholas writes: "Diarrhœa here, as elsewhere, was the prevailing epidemic of the quarter. General disease was comparatively very trifling, and, as is observed during the prevalence of epidemic diarrhœa, shewed a great tendency to become complicated with or to emerge into that disease. Since the week ending August 22nd, which was coincident with a lowered temperature, diarrhœa has undergone a gradual diminution both in extent and severity. Although it has been extensive and of considerable severity, it has been attended with little mortality. This, perhaps, may be in a measure due to a greater tractability of the disease, but is more probably attributable to the early application for medical assistance, which is now adopted by the public generally."

Putney.—Mr. Whiteman writes: "Diarrhœa was almost the only disease of the zymotic class that prevailed here with any great intensity during the quarter. Some of these cases were of a very aggravated character, and two exhibited all the symptoms of cholera that marked the fatal form of the disease in 1848-9 and 1854. The disease throughout was, however, singularly amenable to treatment, and but very few deaths resulted; the patients who succumbed having been, for the most part, the very young or the very aged. The case of ague that occurred in the week ending July 10th presented some peculiar features. The subject of this attack was a man who, it was ascertained, had not been exposed to any of those influences supposed to cause or to aggravate the disease; but his wife had some time before contracted the disease at Sheerness, where she had been on a visit. She had, however, quite recovered the attack, and had been exceedingly well for several weeks previously to the husband being taken ill. Arsenic was tried in this case without any beneficial result, but quinine in large doses quickly destroyed the periodicity of the disease and restored the patient to health. The diminution of uric acid in the urine was very marked upon the decline of the disease."

Swansea.—Mr. Michael says: "Three further cases of small-

pox occurred. One was the servant girl in the house where one of the former cases resided; another was a case of confluent small-pox (fatal) from an infected district; and the other was a very slight case, also imported. The health for the first quarter was good; but diarrhœa of a serious character in some cases was very prevalent. It ran to cases of cholera: one died from exhaustion, and one from consecutive fever. Several cases of dysentery also occurred."

Aspley Guise.—Dr. J. Williams writes: "The case of ague I have reported continued many weeks, and was of a severe and obstinate character. It occurred in a poor man, who had recently recovered from a scald on the foot. The exciting cause appeared to be great exertion in *threshing* in an open barn in windy, changeable weather, and that also in a weak state of the system from recent illness. The locality was Salford—a damp, undrained village, though situated on table land. The water is bad, and the mortality high—the average for seven years, ending 1853, being thirty per thousand. He had severe pain in the back, and frequent delirium from congestion of the brain following the cold stage. Ipecacuanha emetics, with calomel purges, and salines, with tartar emetic, were of the most service. Warm baths assisted materially in shortening the cold stage. Stimulants were injurious, as also quina and cinchona, arsenic, etc., even when debility had considerably advanced. The urine was highly charged with uric acid greater part of the time, and occasionally contained a large quantity of bile. I must not omit to mention that the urine was entirely suppressed on several occasions, and at that time the pain in the back was distressing, no doubt from congestion of the kidneys. When reaction was established, the perspiration, like all the other symptoms, was excessive, and saturated the linen and bed-clothes through. He ultimately did well, but the case extended over two months.

"During the month of June I have had to treat eight or ten cases of stomatitis or simple *muguet*. In all instances the disease has occurred in large families with *over-crowded bedrooms*, though, as remarked by MM. Baron and Billard, it did not seem contagious. The subjects were feeble lymphatic children. There was considerable fever attending the disease; which, in some of the cases, continued for three weeks or more, in most of them the breath was extremely offensive, and a brown membranous exudation covered the teeth and gums, similar to the sordes of typhoid fever. Ipecacuhana emetics, and antimonial salines, were of most service, and calomel or grey powder in alterative doses. A lotion of biborate of soda

with honey appeared useful; and in the worst cases attended with fœtor, a weak solution of chloride of zinc seemed of the greatest service. How much is it to be regretted that the admission of fresh air by open windows during the night is not more enforced! To the close, foul bedrooms of the poor may be traced at least *half the illness they suffer;* and it should not be forgotten, that by the open window *at all times,* we double and treble the area of *breathing space* for the inmates, and sweep away the active agent, foul air, which is hourly saturating their blood and predisposing them to disease."

Saffron Walden.—Mr. Stear says that the quarter was a very healthy one; but diarrhœa was very prevalent, especially during the month of August. He had not a fatal case. The summer has been very hot and dry; to the latter cause he is inclined to attribute the little illness there has been. The harvest has been above the average.

Wellingborough.—Mr. Dulley says that all the cases of "typhus" assumed rather the typhoid character, and occurred in those neighbourhoods where the drainage was bad.

Thetford.—Mr. Bailey sends the following observations for the quarter: "June. This was an unusually hot month, the temperature being above summer heat during half the month, reaching to 89° on the 28th, and during midnight not lower than temperate; the barometer fluctuating between 26·0° and 30·3°, accompanied by little rain; yet we had comparatively but few diseases under treatment. Four cases of modified small-pox occurred in a neighbouring village; the disease was brought by a servant leaving London, and thus communicated to her immediate neighbours. One man and some children in a closely inhabited spot took the disease, but in so modified a state as scarcely to require medical attendance; these had been previously vaccinated, and two infants were immediately vaccinated and escaped entirely from the disease. It spread no further from this spot. Catarrhs and some cases of influenza became rather prevalent from the second week, which probably arose from the sudden reduction of temperature, together with a north-east wind; there being a difference of temperature of 20°. One delicate little boy was suddenly attacked with croup, and, although the most active measures were resorted to, he sank in two days. Ague and remittent fever were more prevalent than usual this month. Only one case of diarrhœa occurred, which came under notice the last day of the month, and seemed to arise from the excessive heat on the 28th. In the case of typhus which occurred in May, a relapse took place; and after a few days it terminated fatally in the

union workhouse. The casual diseases under notice were hæmoptysis, menorrhagia, atrophy, tic douloureux, hysteria, dyspepsia, hemicrania, and petechiæ. The prevalent diseases amongst cattle were pleuropneumonia, sore throat, and some cases of enteritis. Vegetation was very luxuriant and prematurely forward.

"July. The temperature of this month continued exceedingly high from the 11th to the end. During the first week it did not reach higher than 70°, excepting on the 5th, when it rose to 76°; its lowest point being 54°, a difference of 24° in five hours. The quantity of rain during the month barely exceeded half an inch. The highest temperature was on the 15th at 88°, and lowest on the 5th at 54°. The barometer fluctuated but little; the mean being 29·52°. The mean of midnight temperature was 63°, and the mean of dew-point 59°. The diseases of this month were but few. Only two cases of small-pox occurred, which required no treatment. Probably but for the close confinement of the rooms and the huddling together of the children, the disease would not have extended beyond the first case. Croup occurred in two cases; one proved fatal a few hours after I was called to it; the other recovered. For a number of years I have never witnessed so many cases as within the last twelve months; it might be considered epidemic. Several cases occurred under the neighbouring medical men. Diarrhœa was more prevalent, attacking indiscriminately all grades and producing great prostration. Fever of a low type occurred amongst labouring men; one case terminating fatally and the other slowly recovering from the great debility. The case of carbuncle was in an elderly man, at the back of the neck, of a large size; being early incised, it soon suppurated, and did well in a short time. Rheumatism, both acute and chronic, was more prevalent this month: and many cases of cynanche tonsillaris arose from imprudent exposure. Chicken-pox was quite epidemic this month, going through many families in various villages and in this town. The casual diseases under treatment were amenorrhœa, malignant ulcer of the os uteri, anæmia, leucorrhœa, iritis, syphilitic eruption, pulmonary congestion, spina bifida, lepra vulgaris, porrigo, and erythema. But few diseases, and those only of a casual nature, came under treatment among cattle. Fruits and vegetables became prematurely ripe; and potatoes underwent a second growth.

"August. This month commenced with a high temperature; being 10° higher than summer heat; but on the 5th and 6th days very heavy rains fell, amounting to more than fell during the previous three months. This reduced the temperature

12°, which transition was much felt. The barometrical range fluctuated but little during the month; there were only eight windy days. Small-pox and chicken-pox had entirely left the neighbourhood. From the excessive heat of the weather, diarrhœa was extraordinarily prevalent, attacking all grades of society, and in some instances assuming the cholera type. One poor labouring man, who had been affected with diarrhœa some days, although he kept to his work, was suddenly seized with cramp, marble coldness of the whole surface of the body, and violent abdominal pains; the tongue was cold and covered with a white mucus; the stools were completely colourless and running away from him; the pulse was almost imperceptible and very quick; prostration was extreme, and he was apparently insensible to those around him. Brandy was administered, with opium, calomel, and antimony; and a mixture of chlorate of potash, aromatic confection, chloric æther, and acacia powder, in water, in a mixture. This in a few hours brought on a reaction, and he recovered much. The following day he was much improved, but a relapse took place with an increase of all the symptoms, and he sunk in a few hours. In many cases the disease was very severe, occasioning in a few hours the greatest debility I ever witnessed. Scarcely a family escaped the epidemic; and some young infants fell victims to it. Three cases of typhoid fever in one family are under medical treatment: they are labourers, and during the heat they drank largely of small beer and exposed themselves to the currents of air. These cases commenced with diarrhœa, after which fever came on; and they are now under treatment. A case of erysipelas occurred in a woman, attacking the head and face, with smart fever; it was supposed to be brought on by the heat of the weather. Under the usual mode of treatment the case recovered quickly. The casual diseases were neurosis, cardialgia, gout, hysteria, spinal disease, and cancer uteri."

Record of Deaths in Twenty-one Parishes (*population* 9,574) *from the Registrar's Book.*

June.		*July.*		*August.*	
Scarlatina	1	Consumption	1	Diarrhœa	3
Fever	1	Bronchitis	2	Choleraic diarrhœa	1
Consumption	3	Croup	2	Consumption	1
Convulsions	1	Diseased heart	1	Asthma	1
Congenital obstruction	1	Convulsions	4	Debility	5
Laceration of bowel.	1	Spasms	1		
Dropsy	3	Enteritis	1		
Atrophy	1	Dis. prostate gland	1		
Debility	2	Atrophy	1		
Decay of nature	1	Debility	2		
Drowned	1				
	16		16		11

Dudley.—Mr. Houghton says: "There was a very slight decrease in small-pox during the thirteen weeks; and 22 deaths only occurred, against 28 in the last quarter. Measles, too, slightly declined; they caused 12 deaths. Deaths from scarlet fever increased: six persons died: it carried off only two last quarter. Fever, hooping-cough, and croup were nearly the same number as in last quarter. Diarrhœa caused 20 deaths; fever, 9; and infantile convulsions, 14. The total deaths were 303: the average for seven corresponding quarters was 216: the excess of deaths above the average was 87. 106 deaths arose from zymotic diseases, being 1 in 2·287. In London, in the corresponding period, the deaths were 13,998; of these, 4,190 were from zymotic diseases, or 1 in 3·204. The deaths in London in the corresponding thirteen weeks were 13,998: the average of the thirteen corresponding quarters was 14,283, the mortality being 283 below the average. Thus Dudley continues to contrast unfavourably with London."

Barrowden.—Mr. Swann writes: "Diarrhœa was the most common disease; in many cases it might more properly be designated English cholera. I had two cases of Asiatic cholera; the first one was a most severe case, but has done well; both recovered. Mumps appeared at North Luffenham."

East Dereham.—Dr. Vincent thinks diarrhœa has been more prevalent than he can remember since he has been engaged in practice.

Pontesbury.—Mr. Eddowes writes: "A young man, just recovered from small-pox, a native of this neighbourhood, and residing in Staffordshire, returned home in May last. He came by rail to Shrewsbury, a distance of about twenty-five miles; thence he rode home, about fourteen miles, in a carrier's cart. Neither the owner of the cart, nor any of his five children, had been vaccinated. His wife had been vaccinated about thirty years ago. The wife and one son were with the cart on that day. The son, about fourteen years of age, about nine days afterwards, sickened with small-pox. About a fortnight afterwards, three other children sickened; and a few days afterwards the father sickened also. One son was in service; and, hearing of his father being dangerously ill with small-pox, went to see him; a fortnight afterwards he was ill with the same disease. They all recovered. The wife went about: she was never ill a day. They were all convalescent the second week of July. The disease was confined to that family, although in a populous neighbourhood."

Oswestry.—Mr. Cartwright says: "Small-pox was brought

from Bilston, and confined itself to the locality to which it was brought. The diarrhœa was choleraic, with cramps and rice water evacuations. Croup in the early part of the quarter was frequent, and in several cases fatal. Cattle disease (pleuro-pneumonia) was fatal in the locality of the small-pox, but principally upon ill drained farms, and in dirty farm buildings."

Wrexham.—Dr. E. Williams writes: "The small-pox cases (seven) were all in one house, and I did not hear of it spreading in the neighbourhood, which was rather singular. The patients had all been vaccinated in childhood, and only one of the cases proved severe (confluent), the others being very mild. The infection was traced to a school one of the children attended."

Lincoln.—Mr. Lowe says: "The present quarter has been more than usually unhealthy, the month of August especially; owing, no doubt, to the sudden, heavy fall of rain, followed by extreme heat, which we had at the commencement of the month. We had two cases of scarlet fever, both fatal in sixty hours; also several cases of croup, dysentery, and diarrhœa, and much fever of a low continued character, seldom fatal. In many cases of continued fever the tongue and fauces were covered with aphthæ, which, under the microscope, exhibited a true fungoid character; in one family three patients presented the same appearances."

Gainsborough.—Dr. Mackinder says: "Scarlatina has been intruding itself among us, but, as yet, has only got admission into a few establishments. I have had a few cases of the simple and anginose forms. Inflammation of the fauces and tonsils, diphtherite, and stomatitis, have occurred; and there have been two fatal cases of malignant quinsy. Of hooping cough I have seen but one case introduced; and one of carbuncle in a poor man. Chest affections were rare in the quarter; of common continued fever there were a few cases only; and of erysipelas I can number but five patients. From diarrhœa and dysentery I have seen a few sufferers, and have been called to three sharp cases of English cholera. Ague is unknown to us endemically; but a few of our patients have suffered from a mild fever, which assumed an intermittent character, and required quinine or arsenic to establish convalescence. Upon the whole we are among the more favoured localities, in a sanitary point of view; and now that our Board of Health has commenced in right good earnest to redrain the town, we anticipate so long a visit from the fair goddess Hygeia, that the sons of Esculapius entertain serious thoughts of emigrating. The decomposition of vegetable matter, resulting from the

recent floods around us, may, however, bring a little work, should the inauspicious winds spread the noxious emanations over our town. With the exception of a few hours, since the great fall of rain, the air has been moving from the north and east points, and so wafted the insalubrious agents in a diluted form to more remote districts. Many acres of potatoes have been rendered worse than useless; and though the corn in our immediate neighbourhood has not deteriorated much, scores of acres of grass have been under water. Apples and pears are plentiful, but wall fruit scarce. Among cattle pleuropneumonia has been epidemic for the last five years; and for some time past there has been common a disease of the influenza character, affecting the mucous membranes, and ending, in horses, with a peculiar disease of the feet. These diseases have not been aggravated by the floods."

The subjoined Meteorological Report is furnished by Mr. Dyson:—"The past quarter was marked by an almost uninterrupted continuance of fine weather, the temperature generally being above the average. The highest range was 92° in the last week of June. Thunder storms, accompanied by a heavy fall of rain, occurred in the first week in July and the second week in August. Between the 6th and 13th of August, the fall of rain was unprecedented, being upwards of seven inches, or fully a quarter of a year's supply in eight days. The development of ozone was considerable during the month of August, but partial during the remainder of the quarter. We have had on the whole what may be aptly termed a 'tropical summer,' excessive heat and severe thunder storms. Meanwhile the general health of the town and neighbourhood was good, the number of deaths being remarkably small."

Liverpool.—Mr. Bickerton informs us that during the quarter which ended on June 27th, the total deaths registered in the borough were 2,840, being 390 less than the corrected average of the same quarter of the preceding nine years. The mortality from zymotic diseases was likewise below the average, the deaths being 528, while the mean of the former corresponding quarter was 737. As compared with the quarter immediately preceding, there was a decrease of 40. The only diseases of this class showing an increase during the quarter were hooping cough, which rose from 100 to 158; typhus, which rose from 58 to 78; and diarrhœa, which rose from 49 to 61. In the other diseases of this class the mortality was lower than in the preceding three months; scarlatina fell from 119 to 94; small-pox from 46 to 29; syphilis from 32 to 20; measles from 73 to 11 (less than in any previous quarter). Of

MORTALITY AND METEOROLOGY OF LIVERPOOL.

Deaths. Week ending	June. 6th.	13th.	20th.	27th.	July. 4th.	11th.	18th.	25th.	August. 1st.	8th.	15th.	22nd.	29th.
Scarlet fever	5	9	5	8	10	3	6	13	11	6	17	14	24
Measles	2	1	2	2	..	..	..	2	..	2	1	2	1
Small-pox	4	..	2	1	2	3	4	1	5	1	5	5	4
Hooping cough	13	17	17	13	16	10	15	21	13	15	15	19	15
Croup	..	1	..	..	..	..	..	..	..	..	..	..	..
Erysipelas	..	..	..	2	..	..	..	..	..	..	..	..	..
Cholera*	..	..	..	..	2	..	3	2	8	..	6	1	2
Diarrhœa†	4	5	2	12	19	26	23	45	54	54	55	63	73
Typhus	7	8	6	2	12	6	3	5	8	7	6	8	4
Disease of lungs	51	73	69	49	61	54	64	44	66	36	51	48	43
Purpura	..	1	..	..	..	..	..	..	..	2	..	..	..
Intemperance	1	1	1	3	..	2	..	1	..	..	..	..	..
Syphilis	..	..	2	4	..	1	..	..	2	..	1	..	1
Total deaths during each week	173	206	176	188	241	199	214	238	265	233	274	277	277
Corresponding week, 1856	176	..	186	..	161	176	175	179	201	234	226	252	230
METEOROLOGICAL OBSERVATIONS.													
Barometer: Mean	30·02	29·87	30·13	30·23	29·82	29·9	30·18	29·92	29·99	29·91	29·96	30·12	30·12
Dew-point temperature	52·2	48·2	50·0	58·0	54·2	51·9	58·6	59·0	55·2	55·5	59·4	60·1	56·5
Thermometer: Highest (mean)	69·3	63·1	70·2	76·3	70·8	64·9	72·0	70·2	70·8	70·5	70·2	74·7	75·7
Lowest (mean)	53·2	52·1	51·9	60·7	57·5	55·5	58·5	60·5	59·7	58·6	58·6	60·8	60·3
Mean	61·3	57·6	61·1	68·5	64·2	60·2	65·3	65·4	65·3	64·6	64·4	67·8	68·0
Mean of 11 years	58·5	58·7	59·0	61·5	61·5	61·7	63·0	62·5	63·0	63·8	63·0	61·4	60·7
Range	16·1	11·0	18·3	15·6	13·4	9·4	13·5	9·7	11·2	11·9	11·5	13·9	15·4
Mean range, 11 years	12·8	10·9	10·9	10·9	11·9	10·8	10·7	10·7	10·2	11·3	10·3	9.7	9·9
Rain fell on days	3	4	1	1	6	3	3	4	3	5	5	0	0
Rain fell during hours	8·9	21·9	1·8	0·3	18·5	9·7	6·8	18·7	1·4	17·6	16·1	0	0
Amount of rain in inches	0·63	1·45	0·08	0·05	2·38	0·40	0·33	1·05	0·28	1·15	1·88	0	0
General direction of wind	S. SE.	W.	E.	var.	var.	NW.	S. NW.	W.	S. W.	N.	var.	NW.	SE.

* The cases of cholera noted on July 4th and 18th, and August 15th, were English cholera. A death from glanders is reported to have taken place in the week ending July 25th. In the week ending August 8th, eleven persons died in Liverpool above 80 years old.

† A large proportion of the deaths from diarrhœa occurred in children under two years of age.

these diseases hooping cough was the only one whose absolute mortality was above the average. Diseases of the lungs caused 897 deaths, the average of the same quarter of former years being 870. The mean temperature of the quarter was nearly 54¼°, about one degree higher than the average. Rain fell on 42 days, the total amount being 6·96 inches.

Mr. Bickerton has also furnished a statement of the deaths occurring in each week of June, July, and August; and has forwarded copies of the weekly meteorological results deduced from observations taken at the Liverpool Observatory. Of these elaborate documents, however, we are only able to give a very condensed abstract. (See preceding page.)

Wigan.—Mr. Hussey writes: "This quarter there has been very little sickness on the whole, and what is remarkable, with high provisions, my pauper district, including workhouse, was comparatively free from sickness. The maximum heat was 112°. Winds were very variable; but the east wind of late evidently caused more work for practitioners. Potatoes called 'Kemps' are going very fast indeed, and in my family I find there is no economy in purchasing any such, as very nearly one-half are unfit for consumption."

Bolton-le-Moors.—Mr. Pendlebury writes: "During the past quarter English cholera prevailed rather extensively, and in many cases proved fatal to the aged and debilitated. That of infants was remarkable from the great severity and obstinacy of the vomiting, which in many cases was soon followed by collapse, aphthæ of the mouth, and death. Scarlet fever was also prevalent in its malignant type, but not extensively. A few cases were observed to be combined in symptoms with those of English cholera, the eruption alone being absent, so as to decide the diagnosis correctly. Cases of small-pox were over the average number. Diarrhœa and dysentery almost universally prevailed. During the month of July it was remarked by a few practitioners that parturient women were unusually prone to take cold or suffer (about the tenth or twelfth day) from more or less acute attacks of peritoneal inflammation. Ordinary fever cases were both few and mild."

Bramley.—Mr. Radcliffe says: "Diarrhœa was prevalent among infants and young children during the weeks ending June 19th and 26th, and July 24th. Dysentery was prevalent among young children during the weeks ending June 12th and 26th, July 17th and Aug. 14th. Diarrhœa was prevalent among young children and adults during the weeks ending Aug. 21st and 28th. Within the last fortnight diarrhœa has supervened during the progress of several acute cases of

disease. The Rev. J. Rawson, the Registrar of Births and Deaths for this district, has kindly furnished me with the following return of deaths which have occurred from zymotic diseases in Bramley during the quarter. Dysentery 1 (a child, aged 17 months, June); diarrhœa 8. (The whole of the deaths from diarrhœa occurred in the month of August, and among children under 23 months of age); scarlet fever 1 (July); typhoid fever 1 (June); continued fever 2 (August.) Two deaths from scarlet fever occurred in the neighbouring village of Horsforth in June. Scattered cases of epizootic pleuro-pneumonia have occurred among horned cattle, in this and neighbouring districts, in each month of the quarter."

York.—Mr. Procter writes: "In the cases of scarlet fever the eruption generally showed itself kindly, and the cases were usually mild. Although in a large number there was considerable affection of the throat, they have done well, and were not (as well as the cases of measles) attended with much fatality. Small-pox was of frequent occurrence in adults who had been vaccinated, whilst children who had more recently undergone that operation in the same family escaped. Is not this to be looked upon as an illustration of the limited protective influence of the cow-pox? Diarrhœa was very prevalent: it was both choleraic and dysenteric in its character, and obstinate. Many cases were followed by low typhoid fever, occasionally fatal. The cases were general, and independent of locality. I have not met with pure dysentery frequently. Skin affections were rather prevalent. The crops are full and healthy and will yield well, though the late heavy rains have caused a very large part to be sprouted. Potatoes will here be universally very bad, from the ravages of the 'epidemic'. On the banks of the Ouse, where they are extensively grown for the London market, large quantities have become diseased during a single night, which were apparently healthy when taken up."

West Auckland.—Mr. Todd writes: "During the last quarter the weather was unusually warm and dry, with little wind. During the last two months scarlet fever prevailed here and in the neighbourhood very generally. The epidemic was characterised by acute inflammatory fever, with, in many cases, very severe inflammation of the throat, and, in some cases, inflammation of the brain. Many deaths occurred. Erysipelas was more general than usual, generally of a very severe phlegmonous character, with extensive suppuration of the cellular membrane. One case of this kind occurred in a man aged 55—the arm and hand being affected. His wife nursed

him and dressed his arm; she had the disease in a milder form. The inflammation commenced on the back of the right hand in both; the wife being attacked a fortnight after the husband. This looks very like contagion. Diarrhœa was very prevalent, in many cases exhibiting the earlier, and some few the advanced stages of cholera. Being of opinion that this premonitory diarrhœa is the primary stage of cholera, I have paid particular attention to early treatment, and to this I attribute my success, no deaths having taken place."

Lerwick.—Dr. Spence writes: "The month of June was unusually fine and warm, the prevailing winds were from the south-west. During July the weather was warmer than usual, with the prevailing wind south-west, but it was very changeable, with frequent high winds and much fog and rain. August was warm but very foggy, there being more or less fog on fourteen days. The weather during the whole quarter was particularly favourable to vegetation, and the crops of every kind were much earlier than usual: during July and the beginning of August mushrooms were uncommonly abundant. There were a few slight cases of measles, which I could not trace to any imported source. There were very numerous cases of a rather anomalous eruptive febrile disease with coryza and sore throat, which did not run the usual course of measles, though occurring at the same time with it. In some cases it might be best described as 'something between measles and scarlet fever', followed by desquamation of the cuticle in branny scales, and resembling what I have read of as *Rötheln*, or German measles. In other cases the eruption was vesicular, something like varicella, from which, however, it was distinguished by the coryza, catarrh, and sore throat: this form I imagine to have been the same as the disease popularly known in some parts of Scotland as the 'Nirles'. I have been informed that this morbilloid disease prevailed very extensively throughout all the Shetland Islands during the spring and summer quarters, and it was said to have attacked some who had previously had regular measles. The case of cholera was one of cholera infantum. Diarrhœa was very prevalent in July, and in some cases was attended with vomiting and cramps. There were three cases of dothenenteric fever in June, occurring in men who had returned from the seal-fishery by way of Peterhead. Though paronychia is not generally considered as an epidemic disease, I have included it, from a belief that it does sometimes prevail epidemically. The number of deaths from all causes was 9; the average age was 49; there being one below five years and three over seventy, and the greatest age was eighty-six. And

leaving out a case of pneumonia, which was landed from a ship in a dying state, the average age at death would be fifty-three. The causes were encephaloid cancer, 1; chronic diarrhœa, 1; infantile cholera, 1; phthisis, 1; debility from old age, 1; pneumonia, 1; apoplexy, 2; valvular disease of the heart, 1."

Rothbury.—Mr. Summers states that the past quarter was remarkably healthy in this district. With the exception of diarrhœa, no disease prevailed epidemically.

SANITARY LEGISLATION.

THE Board of Health continues; and the Right Hon. W. F. Cowper has again been appointed its President. Medical Reform is settled negatively for awhile. Mr. Gamgee, not satisfied with the conduct of the Home Secretary, has had a fresh brush with Lord Palmerston, and has improved the Premier considerably. In two addresses to his lordship on "Medical Reform a Social Question", Mr. Gamgee, breathing out burning vapour of alcohol, and flourishing the trident of liberty, equality, and fraternity in physics, proclaims a great many solemn truths, which would have come out more forcibly if they had been given with less zeal. His great argument (and who shall deny it?) is, that medical reform lies with medicine as a profession, not with parliament; that it must be founded on science, not on politics.

Lord Elcho has also published a speech on Medical Reform.

An important movement is in progress, viz., the formation of a society called the "National Association for the Promotion of Social Science." The objects are excellent, but the title unfortunate, we fear ruinous. Lord Brougham is the president, and the first meeting will be held at Birmingham on October 12th, and the four following days. The subjects for consideration have been divided into five departments, viz., Jurisprudence and Amendment of the Law, Education, Punishment and Reformation, Public Health, Social Economy. We wish the society every possible success; its designs are great, and its results, whether in the way of success or of failure, will be extreme.

REPORTS AND RETURNS.

CRIMEAN SANITARY COMMISSIONERS' REPORT.—The Report of the Sanitary Commissioners sent out to the Crimea forms a handsome work, illustrated with beautiful maps and drawings.

Sir John Hall has replied to this report, and defended himself and his colleagues from the slur which, as he thinks, has been thrown over him and them by the commissioners.

REPORT ON SHEEP AND CONTAGIOUS DISEASES PREVENTION BILL.—This report is valuable for the able evidence by Professor Simonds on the subject of contagion. The committee draw no conclusions of any length or importance; for which they are commendable, as the questions before them were far too complicated for the decision of unprofessional men. This with all respect. The evidence of Mr. Miles as to the indifferent inspection of Newgate Market is confirmatory of the worst statements of Mr. Gamgee.

NETLEY HOSPITAL.—A return relating to the construction of the Netley Hospital, exhibits a ridiculous specimen of the contradictions of authorities in reference to common sense arrangements. A great hospital for sick soldiers, to be called the Royal Victoria Hospital, being in course of construction at Netley, the medical officers of the Middlesex Hospital, struck with the deficient contrivances for supplying sick soldiers with their daily air-food, sent in a protest to Lord Panmure, and a recommendation in support of the plan on which the Bordeaux Hospital is built. That is to say, they suggested for the Netley Hospital separate wards, open to the air and light on each side, in preference to wards intersected within by a vast corridor, or receptacle for every impure emanation. Lord Panmure upon this remonstrance made further inquiries, and a modification of the original plan of the hospital was drawn up, but not to the satisfaction of the Middlesex authorities, who still stick to their point manfully, and deserve the best thanks of all sensible sanitarians. It is quite hopeless, however, to attempt any defence of the position of these gentlemen; to the unbiassed their arguments are a demonstration, to the biassed even a demonstration is a waste of brain-matter. Time, and the mortality of the Netley Hospital, must be left as arbitrators.

"The life and death test
Is the best, is the best."

THE

SANITARY REVIEW.

JANUARY 1858.

THE REGISTRATION OF DISEASE IN ENGLAND.*

WHOEVER will take the trouble attentively to think over the whole subject of epidemic diseases, their origin, their course, their causes, will not fail to be struck with the certainty of the fact that, before any great general law in relation to epidemics can be discovered, they must be observed on a grand scale for some considerable period of time, and in a systematic and scientific manner.

There are essential differences between the observation of an epidemic, and the observation of other natural phenomena, such as the rolling of a planet, the radiation of light, the development of electricity, and the like.

These latter grand phenomena in nature are always present; the phenomena of epidemics are fleeting. If we would unravel the mysteries of either class of these phenomena, we must do so by the agency of a multitude of minds. The process of observation is, however, different in each case. In the investigation of the permanent phenomenon, time is allowed; and one single individual, in one age, may work usefully and progressively, since he may start on the last foot-mark of him who preceded, and may have the problem for solution always before him. In the investigation of the fleeting phenomenon, the single individual becomes a nullity; and the difficulty of discovering its nature can only be overcome by bringing the whole competent mental strength of the time to bear upon it.

M. Jules Guérin, in drawing up a report for the Imperial Academy of Medicine, on the subject of Miliary Fever, added

* The Registrar-General's Returns since 1850.

Weekly Returns of the Health of the Metropolis. By the Medical Officers of Health. Nos. 1 to 34.

Memoirs of the Imperial Academy of Medicine, Paris. GUERIN, On Miliary Fever. Vol. XVII. 1853-4.

Weekly Return Books of Union Medical Officers, collected from various Unions.

some general observations kindred to the above on the study of epidemics.

"The study of epidemics, submitted as yet to too few regulations, and left too much to individual choice, has never rendered the services it is capable of yielding to science and to mankind. Considered in their highest characteristics, epidemics are the great manifestations of a sole and identical cause, which impresses an uniform and well marked character on all its products, leaving to surrounding etiological actions only a limited and secondary influence. It results from this etiological predominance of the great epidemical cause, that all the morbid individualities in the same epidemic have a general and principal resemblance, and exhibit only particular and accessory differences.

"As a consequence of this general proposition, epidemics become immense centres of observation, in which the extent, number, and diversity of the facts, and the variable conditions of their manifestations, are constantly throwing light upon the most obscure pathological problems. That which is only seen imperfectly or in separate letters, in sporadic diseases, may be read in large characters and entire words during epidemic visitations. The cause of the sporadic disease is almost always feeble and isolated; and, dividing its influence with the ordinary etiological conditions of age, sex, constitution, and season, it gives rise to mixed and ill characterised products, the comparison of which is a matter of difficulty. In a word, in sporadic diseases the elements of uniformity are almost equally balanced by those of diversity, and the products are as the factors. In epidemics the essential cause is one and absolute, and of sufficient energy to take the lead. In the presence of these grand etiological manifestations, the mind requires to make scarcely any effort to seize at once, and to compass in its entirety, that which observation in ordinary diseases is obliged to seek from its useful auxiliaries, analysis, comparison, and numeration.

"Epidemics are in some sort generalisations already prepared; while, in the case of sporadic diseases, induction only obtains the object of generalisation with great labour, by aid of a series of observations made in all times and in all places. But, in order that all possible benefit may be derived from these great morbid revelations, and that we may not lose ourselves in the labyrinth of this mine of inexhaustible riches and fertility, it is necessary that science should have her routes traced out, and that the travellers passing along these should possess a watchword, and be able to harmonise their efforts toward definite ends, if not toward the same ends, so that every acquired idea may form the point of departure for that which remains to be acquired. But, instead of a system of observation based on these principles, what do we see? The greatest divergence in views, efforts, and means! Every one proceeding on just as he lists, generally quite by chance, and devoid of light or object: and such uncertainty and divergence at the point of departure has only for its effect a perpetuation of the uncertainty, if not a complete contradiction in the results.

"The first thing to do", continues this eloquent writer, "before commencing the study of an epidemic, should be to inquire what is already known concerning the disease. Has it already shown itself before, and in the same localities? Does it exhibit the same form and characters, and call for the same treatment? Have observation and experience confirmed or modified conclusions already acquired? Have they revealed new particulars, either for the better definition or better treatment of the disease? This, according to our view, would be the better means of attaching the present to the past, and of continuously fertilising the acquisitions of prior knowledge and observation by means of the present. And let it be understood that we have not in view mere bibliographical learning, the so frequently sterile researches of erudition; but the real product of observation and experience, attached to each other through time aad space, the links of the same chain, constituting what one would willingly call the historical formula of an epidemic."

Such is the grand scheme for the collection of facts relating to epidemics suggested by M. Guèrin. To follow out the suggestion to its ultimate consequences, certain fixed rules for research should be universal.

The first point in the observation of epidemics is unity of purpose and of design. Observers should be made aware what are the chief objects of study in relation to epidemics, and how and when these objects are to be carried out. Let us glance at these important questions.

The study of an epidemic admits of being pursued at two different times: 1. When the epidemic itself is absent; 2. When it is present. The process of observation will necessarily vary very much in each case; and this is the first thing to be remembered in the organisation of a correct system of observation. We believe, indeed, that half the want of success that has occurred in the study of epidemics, has arisen from the fact that these diseases are only thought worthy of consideration, by the majority of observers, at such times as they are present. Hence we see during a serious epidemic visitation all thoughts roused, and every eye working; but no sooner has the visitation fled by, than, as if wearied outright by the duties of the task, all thought rests, and every eye sleeps.

We need not say that this is not a faithful, fair, or calm mode of conducting a philosophical inquiry. The epidemiologist is evidently behind the astronomer in the matter of carrying on scientific investigations. If a comet suddenly comes flaming out of space, and, doubling the sun, hastens back again into the invisible, the world looks on with amazement and terror. But the astronomer, unmoved as ever, merely turns his telescope from planet, asteroid, or nebulæ, to the new visitor,

watches him through his course with eager attention, notes down his wanderings, and, when he is quite lost to view and to the world, begins for the first time to calculate his nature, his wherefrom, and his return. We have often thought that if the eclipses of the sun or moon had always been observed in the same manner as physicians observe transient diseases, the nature of an eclipse would have remained as yet an unsolved problem. Taken simply as a natural phenomenon, the eclipse resembles an epidemic in many particulars; it comes suddenly; it comes on the vulgar irregularly; it lasts only for a limited period; it rouses the fears of the common mind to the fullest extent; and, amongst those who do not understand the subject in its simple true form, every kind of vague and absurd theory is set up in reference to its causes. It is obvious, however, to the learned, that the mere observance of an eclipse *per se* could never have explained the reason of its appearance, and have proved the truth of that reasoning, by the prediction of a recurrence of the same fact. More was required. The facts of the phenomenon had to be taken at the time; the reason of the phenomenon had to be collected from more general observations and relationships, from after study, and from a comprehension of the order and plan of the stellar universe as a whole.

In instituting this comparison between an astronomical and an epidemiological inquiry, we do not wish to lay down an absolute parallelism. We know, indeed, that such does not exist. But there is an analogy in the two studies; and our object is to show that the time in which an epidemic is present is not the only time when it admits of being studied, and that the discovery of the laws of an epidemic visitation can be attempted only when the epidemic is fairly past, and when the facts which it has presented are fully laid out before the reasoner.

It follows, then, that one chief object of study in relation to an epidemic that has recently disappeared, is the consideration, arrangement, and analysis of the facts which such an epidemic has presented—the construction, as M. Guérin would say, "of the historical formula of the disease."

Together with these noted facts, another necessary inquiry in regard to epidemics, and which admits of being followed during their absence, consists in taking a broad physiological view of the great laws by which health is maintained, and in comparing these normal processes with those modified conditions observable in the subject suffering from the epidemic disorder.

From the consideration of those great and philosophical

studies which should be carried out in the absence of an epidemic, and which are suitable, and indeed possible, to but a limited number of minds, we turn now to the less poetical, more matter-of-fact part of this subject—the mode of conducting observations during the existence of a spreading disorder.

In this labour four elements are required.

1. The whole competent mental strength of the district or country in which the epidemic exists.

2. Uniformity in the system of observation.

3. A ready and easy mode of recording observations in a simple and scientific manner.

4. A properly constituted plan, by which the facts observed may be at once collected and submitted to analysis and publication.

These objects, the accomplishment of which would do so much for science and for the world, have long been aimed at, but never satisfactorily achieved. The nearest approach to such a system has perhaps been attempted in France with most success. The plan pursued in France is as follows: Certain medical officers are distributed over the different departments, and are called physicians for epidemics. Upon the prefect of a department receiving information from any of the mayors that an epidemic prevails in his locality, he instructs one of these physicians to repair to the spot, to investigate the causes of the outbreak, to superintend the application of remedial agencies, and to report the result of his observations. In this way a large body of valuable facts is accumulated by competent observers; but, as some of the local practitioners feel considerable jealousy at this interference, and as in some of the poorest districts there are no practitioners at all, it follows sometimes that the authorities are not informed of the existence of an epidemic until it has already long prevailed, or has even passed away, so that few correct data can be obtained respecting it. All reports are forwarded by the physicians for epidemics to the Minister of Agriculture and Commerce.

In Germany, the same has been tried on a smaller and private scale; but the results are, as far as we can learn, almost *nil*. In England, until within the last few years, there was absolutely no system whatever that could be turned to a proper and correct account, in relation to epidemics, until the institution of the mortality returns of the Registrar-General. These returns are invaluable, as showing in some degree, and on a grand scale, the mortality of epidemics, their prevalence, their course, their effects on the sexes, their relationship to season, and it may be, in an imperfect manner, their connexion with

meteorological conditions. Still, these returns are only absolutely valuable as regards mortality; this, their original object, is their only direct good. They exhibit accurately *the balance paid over by disease to death, but not that which is paid over by health to disease.*

In relation to special epidemics, attempts have been made by the Epidemiological Society to collect facts from a large number of observers. These have been in some degree successful; but not sufficiently so to give rise to any great "historical formula". The same may be said of such endeavours as have been made by the General Board of Health.

In the *Association Medical Journal*, a special inquiry was commenced in 1853, and continued for some time with great labour and intelligence. The attempt here was to show the connexion that exists between certain meteorological phenomena and the progress of disease. There can be no doubt as to the great merit of these tables; but, to have made them really useful, the staff of observers should have been increased a hundred fold, and the basis of inquiry should have been wider.

When this REVIEW commenced, now three years ago, it took as one of its leading objects the collection of the histories of epidemics from various observers. Commencing with some dozen learned coadjutors, the Editor found the system generally approved; and now the staff of observers is not less than forty in number. Of the ultimate value of these researches there can be no doubt.

The Association of Medical Officers of Health have more recently instituted a weekly Register of the Diseases in the Metropolis, and are doing excellent service.

Thus we have in England, at the present time, three registers of epidemics: the Registrar-General's Returns; the Local Epidemic Returns of this REVIEW; and the Returns of the Medical Officers of Health in London.

The first is strictly a mortality register; the two latter are right in principle, but deficient in extent.

To supply this latter deficiency, the exertions of a *few* men are insufficient; a grand scheme is required: and our object in this article is to show that in this country the finest possible organisation for the observation of epidemics at this moment exists, and waits only for the word of command and the judicious counsel of a learned committee to become a great and living system.

The plan we have to propose is nothing more than that of making every parochial medical officer's weekly return book the accurate official record of the epidemic and other diseases occurring in his district.

Let us for a moment glance at the extent and capabilities of this proposed plan.

In the first place, the whole of England is fairly divided amongst the union medical officers. The poor of the districts are mainly under their care; and the inference, therefore, is tolerably safe, that no important epidemic could occur in any part without being duly noticed.

Secondly, the points of observation are numerous. We find, from a return made by Mr. Baines to the House of Commons in the year 1853, that there are not less than 3,233 parochial medical officers in England and Wales.

Thirdly, the observers thus occupied are of all men the most fitted to the task. They are stationed in their special localities for great lengths of time; they are well acquainted with the characters of the localities, with the manners, habits, and diseases of the people; and they are, as a general rule, amongst the most zealous, humane, and educated members of the community.

Fourthly, and this is the most important of all, the parochial medical officer, as we know from experience, could return his observations with the least possible labour. He does, in fact, already make this return, in great part, without any reference to its more important bearings. In order to supply his Board of Guardians with correct information on the condition of the poor under his charge, he is furnished with a weekly return sheet. In this sheet it is his duty to enter the name, the sex, the age, the residence, and the disease of each of his poor patients. He has, further, to state the days on which he visited the patient, the diet required, and such other general observations as he may think proper.

Now, having ourselves made use of these return books in collecting facts on disease, we can speak with certainty as to their value, even in their present rudely constructed form; and could these records, as they now exist, be brought together, we might glean from them a large amount of valuable information. But if these 3,233 weekly records, thus rudely drawn up, and for trifling objects, comparatively speaking; if these records were so modified as to become really scientific registers of epidemic diseases; if, thus modified, they were regularly transmitted to some central authority, who could use them for a definite purpose, what truly important tablets of disease they would become, what firm bases for the historical formula! There would then be no disease registration in the world like that of England.

As regards the forms themselves, it is worthy of remark

that, in their present state, they perform only a temporary purpose. They supply the guardians of unions with information for the week, and are then forgotten. We believe that, under any new system, which should require them to be sent away after the meeting of the board, a duplicate need scarcely be retained.

The modifications that would be required in the returns themselves are few and simple. In the first place, in every return book there should be drawn on the fly-leaf a map of the observer's district, and a brief description of the geological character, extent, latitude, longitude, produce, number of towns, population, and the like. These particulars, once drawn out and printed, would remain for many years without any material alteration. At all events, they would give the medical observer no trouble, though rendering his reports infinitely valuable.

The modifications required in the weekly returns are very few. The columns would remain unaltered. In the columns, however, now set apart merely to express the number of visits paid, an additional letter or two should be introduced, to indicate certain important facts. The V or the X might still stand to represent the visit; but the letters D D should be inserted, to show the day of commencement of disease; the single D to represent the day of death; the letter C to show when convalescence commenced; and R to point out the time of complete recovery.

By an extension of the day columns, and by a few cross lines, an arrangement might be formed for the recording of the meteorological readings of the week; and the date at the top, as given in present returns, would decide the question of seasons. The two last columns might well remain unchanged; the one for necessaries would show the diet of the patient; the one for observations would leave room for notes on treatment, hygienic conditions, or other special points. This column would be better if left rather larger than it now stands in the return book.

Such modifications as are required are shewn briefly in the accompanying table.

For the mere observance of epidemics, then, there exists in this country every convenience ready to hand, and laid out on a plan magnificently large and comprehensive. The successful execution of the scheme depends on the will and exertions of the Government, by whom alone it can be made available.

First. The medical officer, on taking charge of any district, should receive the drawing up of a correct disease return as an imperative part of his duties, for the performance of which he should have just and fair remuneration.

RETURN AS IT AT PRESENT STANDS.

FORM P. *Week ending Friday, 13th day of November* 1857.

Name.	Age.	Residence.	Parish to which chargeable.	Nature of Disease.	Days when attended, or when Medicines were furnished. Sat.	Sun.	Mon.	Tu.	Wed.	Th.	Fr.	Necessaries ordered to be given to the Patient.	Present state or termination of the case.	Observations.
John Williams	10	Chiltern	Chiltern	Scarlet fever	x	x	..	x	x	x	..	2 oz. wine daily	Serious	First case imported.
REMODELED FORM.														
Charles Jacob	12	Chiltern	Chiltern	Scarlet fever	V, DD	V	V	V	V	V	D	2 oz. wine daily	....	Disease of malignant type. This was the second case, conveyed clearly by infection.
John Jones -	24	St. George	St. George	Rheumatism	V	V	..	V	..	V, C	..	....	Convalescent	A mild case.
W. Thompson	16	Dunwich	Dunwich	Measles	V, DD	V	V	V	V	V	V	....	Improving	Bronchial symptoms severe. The epidemic has been prevalent during last 2 months.
Mary Atkins -	36	Dunwich	Dunwich	Measles	..	V, DD	V	..	V	..	V	1 oz. wine daily	Nearly well	A mild case.
Thos. Williams	14	Stone	Stone	Scarlet fever	..	..	V, DD	V	V	V	V	2 oz. wine daily	Serious	The epidemic spreading rapidly.
Direction of wind					NE.	N.	NW.	N.	N.	N.	NE.			
Ozone					1	0	1	3	0	1	5			
Mean temperature					47°	49°	50°	40°	41°	43°	46°			
Barometer					29·7	29·	29·6	30·	29·8	29·7	29·			
Rain in twenty-four hours (inches)					·004	·012	·006	·010	·007	·000	·002			

Secondly. The weekly return, immediately after it has served its local purpose, should be dispatched at once to London, to be submitted to a Registrar-General of Disease, and to be reported upon weekly after the manner of the reports of births and deaths, and the Registers of the Medical Officers of Health.

With these remarks, we leave the suggestions contained in this paper in the hands of the reader. Pile upon pile, mouldering away amongst dust and rubbish in the cellars of workhouses, and in the surgeries of medical men, lie what might become the greatest records of disease ever published—the veritable histories which Government has sporadically sought after at great pains, great cost, and little advantage. Sometimes these documents are sold as waste paper; and, instead of fulfilling their legitimate and useful objects, are turned to the clothing of perishable butter and briny bacon. Surely this veritable outspreading of pearls before dead swine ought not to continue.

We feel it possible that one objection may be made to these records. It may be said that they will not represent the epidemics of a whole population. To this we answer, that the number of cases occurring in any given epidemic is of no importance whatever, if the course of the disease be observed over an immense and isolated tract of land, such as England; if its general characters be carefully described; and if the conditions which peculiarly favour its manifestation be accurately pointed out. From three thousand weekly returns, all constructed on the same principles, these and many other facts could not fail to be elicited; while from the facts themselves, carefully stored up for some years, might eventually be wrought out the historical formulæ of not one, but many, of the epidemic diseases.

THE SOCIAL EPIDEMIC.*

THE subject of the work in hand has been so freely discussed in the periodicals of the day, that it would be mere prudery to offer any apology for drawing attention to its contents. No one at all acquainted with the state of modern society will be at all disposed to deny that the evil of which the book treats is of immense magnitude, for its roots extend deep into the soil on which our present social fabric rests, whilst its branches overshadow the privacies of our domestic life. It is an evil which leaves its traces discoverable by the eye of the physician among all classes of the people, and from which neither riches form a safeguard nor poverty a protection.

It is an ungracious task to hold up the mirror and show the form and pressure of the time; for, while it shows us our railways, telegraphs, and leviathan steamers, our monster meetings for preachings, for social science, and for the fine arts, it shows us withal a shady side of vice and sensuality, which in magnitude can only be likened to that of the accursed cities of antiquity. We sing an everlasting "Io Pæan" on progress, on the march of intellect, and on national prosperity. We plume ourselves on subjugating the elements, we overcome the winds and the waves, and try to annihilate time and space. Now and then, with great timidity, some chivalrous man of science ventures gently to raise the veil

> ("For in the fatness of these pursy times,
> Virtue itself of vice must pardon beg,")

which screens our social habits, and gives us a view of the obscene mysteries, which are being constantly enacted in our streets, and a picture of manners comparable only with the wildest saturnalia of the worst of pagan times. In the book before us, we have the death's head and cross bones brought into the feasts of good society; and enough is related to mar the complacency of the most well-bred conventionalist.

Whoever knows anything of London life, will at once confess that the evil which the author has endeavoured to describe he has not at all attempted to exaggerate. The actual misery and disease need no description. They describe themselves, and may be seen in the streets, unless kept out of sight by the police. Those who require facts and figures for conviction, must read the statistics of venereal diseases. The author marshals his facts which look like a funeral procession; he preaches a

* Prostitution considered in its Moral, Social, and Sanitary Aspects in London and other large Cities; with proposals for the mitigation and prevention of its attendant evils. By WM. ACTON, M.R.C.S. London: 1857.

funeral oration on the death of national chastity. He does more; he gives us a *post mortem* examination, and demonstrates that our seeming virtue is little other than a whited sepulchre,

> "Whiles rank corruption, mining all within,
> Infects unseen."

In treating of the causes of prostitution, the author frequently quotes Mr. Mayhew's letters to the *Morning Chronicle*, in which the demoralisation of children is described as taking place in the low lodging houses of London and elsewhere. It will suffice to say, that these letters describe scenes of juvenile precocity in vice, which the narrator confesses cannot be detailed in print. Mr. Acton observes:

"The extreme youth of the junior portion of the street walkers is a remarkable feature of London prostitution, and has been the subject of much comment by foreign travellers who have published their impressions of social London. Certain quarters of the town are positively infested by juvenile offenders, whose effrontery is more intolerably disgusting than that of their elder sisters. It is true these young things spring from the lowest dregs of the population; and from what I can learn of their habits, their seduction, if seduction it can be called, has been effected with their own consent by boys no older than themselves, and is an all but natural consequence of promiscuous herding,—that mainspring of corruption among our lower orders."

Under such circumstances, it can hardly excite surprise that a sort of practical communism should prevail among the lower orders. The value of chastity is not appreciated by them as it should be. Thus the author:

"It may, I dare say, be objected, that in preceding pages I have lent myself to a gross slander upon the public at large, by setting at so grievous a discount the popular estimation of virtue and propriety. But it is not to a fervid imagination, but hard memory and the experience of our profession, that I owe the preceding facts and analysis; and when I consider what I have written, I confess I can see no single statement or opinion that can surprise the major part of readers conversant with London, although their juxtaposition be new, and favour startling inferences. If we consult the experiences of the clergy, who are the best of authorities upon the social condition of both urban and manufacturing communities, or men who, like the Brothers Mayhew, have sifted to the dregs the lower orders in capital cities, and in the metropolis particularly, we find that female honour by no means holds its theoretical position in public esteem." (p. 71.)

So, from the evidence of people best capable of judging, it would appear that we are "drifting" into a sea of socialism. As to the extent to which prostitution prevails, it is impossible to form any approximative calculation; thus

"Mr. Colquhoun, at that time magistrate at the Thames Police Court, rated them at 50,000 some sixty years ago. The Bishop of Exeter spoke of them as reaching 80,000. Mr. Talbot, secretary of a society for the protection of young females, made the same estimate." (p. 15.)

It can easily be understood that this is a profession which, whether it be practised for love or money, is usually carried on as privately as possible, and that it is only the open and avowed courtesans who are constantly walking the streets, or who inhabit houses of ill fame, that are likely to come under the cognisance of the authorities. But this class forms but an insignificant portion of the female community who are living in more or less open concubinage. As the wages accorded to female labour in slopwork, millinery, dressmaking, bookbinding, artificial flower making, &c., are not such as to afford an honest subsistence, many girls who have not other means beside their work are partly compelled by want, partly encouraged by example, and partly tempted by pleasure, to leave the steep and thorny way to heaven, for the primrose path of dalliance.

It would appear almost a work of supererogation to quote figures to prove that prostitution prevails to an enormous extent; however, those exquisite optimists who desire to learn the truth would do well to look into Mr. Acton's book, where they will find the evidence of all classes. The clergy, the police, the reputable householders and municipal corporations, the medical men and hospitals, all testify to the extent of the moral disease. We shall therefore take it as an established fact, that all the accounts we hear are not exaggerated.

The only excuse for bringing this subject before the eye of the general public, is the hope that reformation may be brought about. The publication of the details of a revolting traffic; the natural history of the professed woman of the streets; the description of the means and appliances of professed bawds and their modes of communication with their patrons, is not an unmixed good to the community. Although a scientific investigator may be called upon to detail the results of his experience, and although the *litterateur* may find his end in giving photographic representations of filth and low debauchery, and although this may stimulate the really good to exert themselves for the amelioration of vice, yet, to the sensual, the vicious, the young and inexperienced, these scientific books thus popularised are too liable to be converted into mere guide-books to vice, or to afford amusement to the prurient fancy of the depraved; and thus, as it were, they hold a candle to the devil, by suggesting means and appliances for vicious indulgences which otherwise might never

have been thought of. The following is quoted from Mr. Mayhew's letters to the *Morning Chronicle.*

"I used to work at slopwork, at the shirtwork, the fine full-fronted white shirts, I got 2¼d. each for 'em. There were six button holes, four rows of stitchings in the front, and the collar and wrist-bands stitched as well. By working from *five o'clock in the morning until midnight* each night, I might be able to do seven in the week, these would bring me in 17¾d. for my *whole week's labour.* Out of this the cotton must be taken, and that came to 2d. every week, and so left me 15¾d. to pay rent, and living, and buy candles with. I was single, and received some little help from my friends, still it was impossible for me to live, *I was forced to go out of a night to make out my living.*" (p. 25.)

Now we have no hesitation in saying, that the gentleman who noted this down was imposed upon by some canting girl of the town. Any woman who knows anything of needlework will say at once that this is a ridiculous fable. Any woman may earn at least eight or ten shillings in the workrooms of London, if she be not right down idle; besides, if the girl in question went out at night to eke out a living, we can hardly fancy her close working for nineteen hours a day, and for six days, for the small sum of one shilling and threepence halfpenny. We were hardly prepared for such implicit faith, in a gentleman whose humanitarianism seems especially devoted to young thieves, prostitutes, and ticket-of-leave men.

We cannot follow Mr. Acton in his *Harlot's Progress,* nor accompany him in his peregrinations through their *Homes and Haunts of London;* through *dress houses*; houses in which prostitutes lodge; introducing houses; accommodation houses; casinos; pleasure gardens; and the streets. But we proceed to the consideration whether any means can be suggested for the mitigation of the evil. First, it may be asked, whether legislation can do any good. There is great doubt whether good can come of endeavouring to make people virtuous by acts of parliament. There is the old adage, *Leges sine moribus non prosunt.* We dare not go so far as the hope of Mr. Acton, that the day may come when the communication of syphilis to a minor may be made a felony (page 130). Nor is it so clear that all the centralisation of despotic bureaucracy is a match for the spread of licentiousness. If we are to believe all accounts of the doings in Paris, in Naples, in Madrid, and in nearly all the capitals of Europe, we shall have to bewail more over the degeneracy of morals in general, than of London in particular. And if we compare the prevalence of venereal disease in military hospitals of different countries, we

find that notwithstanding all police and medical arrangements, our *laisser aller* system, as it is called, is not so prejudicial as might have been expected. Thus of British troops we learn that—

"For seven years and a quarter previous to 1837, the annual number of venereal diseased cavalry was 181 per 1,000, and from 1837 to 1847, 206 per 1,000; while at Brest, the Portsmouth of France, out of 5,947 men, forming in 1852 the marine artillery and infantry of the garrison, 1,635 or 27·50 per cent contracted syphilis. In 1853, out of an effective of 6,294 individuals, 2,144, or 34 *per cent.* were attacked." In Brussels, "of a garrison of less than 3,000 men, the entries into the military venereal hospital were 413 in the year 1856. On the other hand, American military reports are more favourable, being on an average only one venereal case to 35 men." (p. 39.)

Thus, under rigid rule, civil and military, there is no encouragement for drawing tighter the reins accorded in England to individual liberty. We extract from page 79 some examples which our continental neighbours deem requisite for the preservation of decency in disgrace. Every registered woman of the town in Paris is furnished with a sort of "ticket-of-leave," which may be understood as a government recommendation and guarantee of the sanitary excellence of the commodity for disposal, (*breveté par S. M. I.*, would be the proper description). On one side of this ticket is the name, with the woman's age, appearance, residence, &c., with the fortnightly signature of the medical inspector. On the other side of the card are printed the rules:—

"Obligations and Restrictions on Public Women—

"Public women, *en carte*, are called upon to present themselves at the dispensary for examination once at least every fifteen days.

"They are called upon to exhibit this card on every *request of police officers and agents.*

"They are forbidden to practise their calling during daylight, or to walk in the thoroughfares until at least half an hour after the public lamps are lighted, or at any season of the year before seven o'clock or after eleven p.m.

"They must be simply and decently clad, so as not to attract attention by the richness, striking colours, or extravagant fashion of their dress."

Many more regulations follow which we cannot afford space to copy, but simply state that they attempt to provide a certain amount of respectable exterior in the carrying out of an infamous traffic, while at the same time they endeavour to control disease. We doubt on the whole whether either of these results is obtained.

This system once prevailed in England, but we suppose it has become obsolete from its impractical value. For, on referring to *Stow's Survey of London*, 1603, we find a notice of the stews on the bank of the Thames:

"Next on this bank was sometimes the Bordellos or Stewes, a place so called of certain stew-houses privileged there, for the repair of incontinent men to the like women, of the which privilege I have read thus.

"In a parliament holden at Westminster the 8th of Henry II, it was ordained by the commons, and confirmed by the king and lords, that divers constitutions for ever should be kept within that lordship or franchise, according to the old customs that had been there used time out of mind, amongst the which these following were some:—

"'That no stew-holder or his wife should let or stay any single woman to go and come freely at all times when they listed.

"'No stew-holder to keep any woman to board, but she to board abroad at her pleasure.

"'To take no more for the women's chamber in the week than fourteen pence.

"'Not to keep open his doors upon the holidays.

"'Not to keep any single woman in his house on the holidays, but the bailiff to see them voided out of the lordship.

"'No single woman to be kept against her will, that would leave her sin.

"'No stew-holder to receive any woman of religion, or any man's wife.

"'No single woman to take money to lie with any man, but she lie with him all night till the morrow.

"'No man to be drawn or enticed into any stew-house.

"'The constables, bailiff and others, every week to search every stew-house.

"'No stew-holder to keep any woman that hath the perilous infirmity of burning, not to sell bread, ale, flesh, fish, wood, coal, or any victuals, &c.'

"These and many more orders were to be observed upon great pain and punishment. I have also seen divers patents of confirmation, namely, one dated 1345, the 19th of Edward III.* Also I find that, in the 4th of Richard II, these stew-houses, belonging to William Walworth, then mayor of London, were farmed by Froes of Flanders, and spoiled by Wat Tyler and other rebels of Kent. Notwithstanding, I find that ordinances for the same place and houses were again confirmed in the reign of Henry VI, to be continued as before. Also Robert Fabian writeth, that in the year 1506, the 21st of Henry VII, the said stew-houses in Southwarke were for a season inhibited and the doors closed up, but it was not

* Li St. Mary Eborum. "English people disdayned to be baudes. Froes of Flaunders were women for that purpose." Stow.

long, saith he, ere the houses there were set open again, so many as were permitted; for, as it was said, whereas before were eighteen houses, from thenceforth were appointed to be used but twelve only. These allowed stew-houses had signs on their fronts towards the Thames, not hanged out, but painted on the walls, as a Boar's Head, The Cross Keys, The Gun, The Castle, The Crane, &c."

In a note by Wm. J. Thoms, Esq., Secretary of the Camden Society, in his edition of Stow, he adds:

"The class of persons referred to in the text became the subject of legislative enactment in this country, apparently at a much earlier period than in France, where their numbers appear to have increased so greatly during the reign of St. Louis as to have called forth an extremely severe ordinance for their regulation, which is quoted by Roquefort in his *Glossaire*, s. v. *Femmes folles de leur corps*. See also Legrand d'Aussy, *Fabliaux ou Contes*, iv, p. 217, *ed.*, 1829."

Seeing then that legislative enactments have never proved of much value in limiting the progress of the disease, it would hardly be possible, in the present tone of the public mind, to revive laws which might be considered entrenching on the liberty of the person. It is to be considered whether our police are such patterns of morality and integrity, as to be entrusted with such a power of annoyance as that of demanding, at all times, a view of the registered card of an unfortunate woman. It is impossible to deny that this publicity attached to individuals by registration of their profession, would be a lifelong and ineradicable disgrace, and would only make those thus circumstanced more reckless and abandoned. As Mr. Acton asserts that most of these women, after three or four years dissipation, re-enter the ranks of the ordinary population, and as their main hope will ever be that their past life may be forgotten, we cannot help thinking that the continental system of registration and surveillance, would not only be rejected by English females, but would be found utterly impracticable by our government. Nor does it seem clearly established why their diseases should claim a special governmental care. It has ever been the admiration of foreigners, that our hospitals are supported by voluntary contributions; and we have yet to learn that, on the continental plan, the patients have either better care, or better skill than what they have in England. It is also suggested by the author, either that the power of domiciliary visitation should be carried out by the district medical officers of health, or that there should be divisional surgeons and inspectors. We cannot think that women would in general submit to this inquisitorial system. However

little the public may think of the *femme galante*, she is by no means disposed to think as little of herself. Although she may lack modesty in one particular, she is by no means willing to be treated with less deference and respect than that which her education, her intelligence, her manners, or her good looks will command for her. As for a self-supporting sanitary society, there is but little possibility of any such scheme being carried out. Ladies for whom such a "benefit society" is intended, are habitually improvident, and if not so, would scarcely care to invest money in a sick club, any more than in a savings' bank. We are told that at the Royal Free Hospital more cases of venereal disease are relieved, than at any other hospital in London. And this is not to be wondered at, because, at that hospital, no recommendation from governors is required.

It does seem that the only practical way of doing any good to the unfortunate who may be suffering from this disease, would be to increase the hospital and dispensary accommodation for this especial complaint, and to let it be on the same principle as that of the Royal Free Hospital. Start a hospital or dispensary for all comers, and let there be no historical questions asked of the miserable sufferers; let disease be the simple letter of recommendation, and then, no doubt, the sick will avail themselves of such a charity with heartfelt gratitude. No one likes to publish his own disgrace: then why should we expect that women should prove an exception? Nay, rather, we think, would they suffer disease and death, than let all the world know their degradation. We cannot therefore hope, nor indeed could we wish, that Englishwomen, however low they may have descended in their habits, would yet voluntarily enrol themselves either as professional prostitutes, or as members of a prostitutes' mutual aid and sanitary society.

Whether from the increasing decay of morals, or whether from the publicity now given by the press to all the vices of the age, it is certain that great uneasiness is felt by all thinking people at the progress which vice seems to be making amongst us; and people are naturally anxious, if only for self-preservation, that some check should be placed on its development. Neither laws nor punishments can ever supply the place of sound moral training; and all the centralisation in the world will never reform an iniquitous age. Concubinage, which is but a substitute for polygamy, is generally considered as a token of national decline.

There is an evil, possibly even greater than that which has been called the greatest of our social evils; and that is, the consummate class selfishness which prevails. This feeling

recognises only the elect, and abandons the rest to reprobation. *Respectability* is the name under which this principle is personified and worshipped. Her votaries live within a charmed circle, comfortably supplied with everything requisite for their physical and spiritual wants. They have good tables, and soft seats in the place of worship. Well dressed, well gloved, and well scented, they carry prayer-books bound in curious antique; they behave decorously, make all responses, and sing *sotto voce*. Well may they congratulate themselves! The votary of *Disreputability* acknowledges that her goddess has a brazen impudent carriage, but says she is no more than what she professes to be, whilst she accuses Respectability of being little better than a solemn mockery. Open blackguardism is what she prefers, rather than organised and conventional hypocrisy.

We must conclude this notice of Mr. Acton's book, and pay a tribute to his courage in bringing before the British public the dark side of their social condition. It must evidently tend to ameliorate this state of things. What are Church and State about, that they take no heed of the times? Have they adopted the motto, *Après moi le deluge?* We shall see.

METROPOLITAN HYGIENE IN THE PAST.*

In an era when the public intelligence is awake to the importance of sanitary measures; when the truth that the health of the community has been entrusted in a great measure to the keeping of the community seems to be obtaining a hold on the minds of men; when sanitary commissions are appointed, and sanitary officers are salaried; when voluminous blue books are printed by Government, and modest reports by vestry boards; when noble lords utter sanitary addresses, and ignoble com-

* Stow's Survey of London. By STRYPE. London: 1720.

Londinium Redivivum. By JAMES PELLER MALCOLM. London: 1803.

The History and Art of Warming and Ventilating Rooms and Buildings. By WALTER BERNAN, Civil Engineer. London: 1845.

Archæologia, vol. XX.

Natural and Political Observations made upon the Bills of Mortality. By Capt. JOHN GRAUNT, F.R.S. (Sir William Petty.) London: 1676.

Orders thought meete by Her Majestie, and her Priuie Counsell, to be executed throughout the Counties of this Realme, in such Townes, Villages, and other places, as are, or may be hereafter infected with the Plague, for the stay of further increase of the same. London: 1592.

Certain Necessary Directions, as well for the Cure of the Plague, as for preventing the Infection. London: 1636.

A Collection of very valuable and scarce Pieces relating to the last Plague, in the year 1665. London: 1721.

moners disburse sanitary rates, a glance at the hygienic condition of the great towns of our empire in bygone times may present some material for comparison and reflection, and will at least afford us no insignificant ground for congratulation.

In the present article, we do not pretend to give anything like a connected history; such a work would extend far beyond the limits of a review. We only hope to lay before our readers some few historical facts, frequently disconnected with each other, some of which may be found suggestive to the England that is, some merely illustrative of the England that was.

In turning over our annals, one fact in relation to the subject forces itself upon our attention; it is that the eras marked by sanitary reforms, have been the eras of great pestilences. We owe our present movement to the cholera, as our ancestors owed similar ones to the plague and other epidemics. For centuries the mortality in our population was far higher than at present, and the increase was proportionally far less. Much is to be allowed for the effects of civil wars, of vindictive and oppressive legislation, and of popular excesses. But, making ample deductions for these, we may safely assert that human life was sacrificed wholesale to ignorance and inertness; and it was not until some great visitation swept off the people in masses that their rulers were aroused to a temporary exertion, and that they themselves were terrified into a temporary reform.

Another fact that strikes the inquirer, is the frequent similarity existing between the hygienic measures pursued in former ages, and those at present so widely promulgated. It is no new discovery that the presence of filth and offal is prejudicial to health, that cattle markets and slaughter-houses should be extra-urban, that the water supply should be pure, that sewerage and drainage are indispensable, that the resting places of the dead should be removed from the living. These things were acknowledged to be truths by the better instructed in what we are accustomed to consider comparatively dark ages; but, as in our own times, they were not acted on until survivors were aroused from their apathy by some great devastation.

To illustrate what we have said. The fourteenth century was marked by three fearful epidemics, known to historians as the first, second, and third mortalities. The first was the celebrated black death, the most awful pestilence the world has ever known. After the second, which occurred in the year 1361, and which was either of the same nature as the former, or, as is more generally believed was an irruption of the ordinary bubo plague, Edward III, in Parliament, issued a proclama-

tion forbidding the slaughter of cattle in the city of London, on account of the pollution of the streets and sewers thence arising, which was supposed to foster the pestilence. It was further ordered, that the killing of meat for the city should be confined to the precincts of Stratford and Knightsbridge.

Three hundred years afterwards, in 1636, the plague again swept over our capital, carrying off 10,460 people. The reigning monarch, Charles I, applied to the College of Physicians for advice and instructions. In the recommendations of the College, drawn up by royal authority, we read: "It were also to bee wished that the Slaughter-houses were vtterly put from out the liberties of the City, being in themselues very offensiue; and that funnells in Church-vaults be considered of, and the depth of graues." In the great plague of 1665, the same advice was repeated.

Two centuries elapse, marked by revolutions, political, social, and intellectual. The plague has long become extinct in our land. Another wide spreading disease attacks the population; and its onslaught is repeated and repeated again with alarming rapidity. The powers that be have again recourse to the men of medicine; and, with provoking sameness, in the year 1854, we find from Dr. Sutherland's report the slaughter-houses still existing in crowded neighbourhoods, and referred to, rightly or wrongly, as causes of local outbreaks of cholera. Verily, the English are a people not given to change.

We would not be supposed from these remarks to undervalue the great sanitary improvements of modern times, or to attribute to our ancestors a greater perfection in the art of living than that to which they had arrived. All that we intend to show is, that many of the same imperfections in our system have been allowed to descend unaltered to our own times, and that a want of enlightenment in former generations cannot always be pleaded as apology.

In order that we may give our readers an idea of what has been accomplished, we have endeavoured to group together a few facts connected with sanitary matters as they have existed since the era of the Norman Conquest; and we shall principally, though not exclusively, confine our descriptions to the heart of the empire, the great metropolis.

The oppression and cruelty which accompanied and succeeded the Conquest, found their results in the hygienic condition of the people. It is admitted by all, that the towns suffered directly less under the rule of the conquerors than the country districts; but, in consequence of the ravages of sword and fire, the excessive taxations, and the cruel forest laws,

agriculture was at an end: whole districts, previously smiling in peace and overflowing with plenty, were depopulated, and the whole nation again and again experienced famine and its accompanying pestilence. What the resulting disease was, we have no certain knowledge. Sometimes it appears to have been dysenteric flux, sometimes fever, probably similar to that which occurred in Ireland after the failure of the potato crops. Space will not allow us to quote authorities; we would only refer the reader to the touching accounts given in the *Saxon Chronicle*, and scattered through the monkish historians.

But the Normans were a great people. Foremost in arms and first in council of all the races sprung from the teeming North, civilisation found in them her aptest scholars, and the arts their most enthusiastic votaries. Their refinement recoiled from the coarse gluttony and the boisterous drunkenness of the Saxon burgher and yeoman, whom they likened to the swine, which formed a large part of the wealth of the country and of the food of the town. The dominant race, however, were comparatively few in number; and it was long before hatred and poverty permitted the conquered to adopt in any degree the manners and modes of life of their conquerors. Still, we should err, did we not attribute to Norman influence many of those improvements which must eventually have affected the health and well being of the population.

In the ages immediately succeeding the Conquest, London was surrounded by a wall, which skirted along the river on the south side from the Tower to the Fleet, and on the north took the form of a crescent, with the exception of an indentation between the portals of Cripplegate and Aldersgate. Surrounding this wall was a ditch, continuous on the western side with the Fleet Ditch, or, as it was then called, the river of Wells, from the number of wells (which still give their names to the surrounding districts) whose overflowing waters augmented its stream. This ditch, which was originally 200 feet broad, formed the principal part of the existing sewerage of the city. It was commenced in the year 1211, and finished in the year 1213. Measures were constantly required from time to time, to keep this ditch free from accumulations of filth and offal, and also to prevent encroachments on it by the gardens and houses of the citizens. As late as the time of Elizabeth, we find various sums expended by the citizens for this purpose: but the earlier proceedings were evidently taken rather with the view of maintaining the defensive character of the fosse, and the navigation and wharfage of the Fleet river, which, in a petition of the fourteenth century, is said to have been wide

and deep enough to carry ten or twelve ships as high as Fleet bridge, than from attention to its sanitary influence. Still, we find early proof of the recognition of the injurious effect on health produced by this vast open drain. In 1290, the Carmelite Friars, the Friars Preachers, and the Bishop of Salisbury, whose house then stood in Salisbury Court, complained to the King and Parliament of the putrid exhalations arising from the Fleet river, which were said to have occasioned the death of several of the brethren, and to be powerful enough to overcome the odour of the incense used in their services. One of the principal sources of its impurity at that time, was the great number of tanners' yards which existed in the neighbourhood.

Through all the vicissitudes which left their impress on old London, the enormous Fleet Ditch remained open to contaminate the air by its noxious exhalations; and it was not until the year 1736 that the great arch to carry off its waters was built, since which time its ancient course has marked one of the principal metropolitan sewers. We probably shall not do wrong, if we ascribe to its influence the high rate of mortality which obtained in the parishes on its banks during some of the great plague epidemics. Of this we subjoin a short table as a specimen.

	In Plague Year 1593. Died.	Of Plague.	In Plague Year 1625. Died.	Of Plague.
St. Andrew's Wardrobe, and St. Ann's, Blackfriars	347	144	709	406
St. Andrew's, Holborn....	1561	936	2190	1636
St. Bride's	897	607	1481	1031
St. Sepulchre's	3440	2502	3425	2420
Total deaths from plague		4189	.....	5493

The total number of deaths from plague in London, in 1593, was 11,503, so that the district above named furnished more than one-third of the whole mortality; in 1625, when the deaths from plague amounted to 35,417, upwards of a seventh.

We are not to suppose that this great nuisance existed without frequently attracting public attention. Large sums of money were uselessly expended in attempting its purification. It furnished a frequent theme to the wits of a bygone age, and is immortalised in perhaps the most polished satire in the English language.

> "To where Fleet ditch with disemboguing streams,
> Rolls the large tribute of dead dogs to Thames,
> The king of dykes! than whom no sluice of mud
> With deeper sable blots the silver flood.
> Here strip, my children! here at once leap in,
> And prove who best can dash thro' thick and thin."
>
> DUNCIAD, b. II.

Our space will not permit us to give a succinct history of the sewerage of London. As population increased and civilisation progressed, the adoption of mere open water-courses was relinquished, and a better system was gradually introduced. After the great pestilence of 1603-4, we read in Strype's edition of Stow, that "Sir Leonard Halliday, maior anno 1606, laboured much for a river to be brought on the north of the city into it, for the cleansing the sewers and ditches; for the better keeping London wholesome, sweet, and clean. Sir John Walls, the next maior, seconded this good endeavour of Halliday. And one Nicholas Leate, a worthy and grave citizen, was very painful and industrious in the furtherance of this work, and the like therunto. And the city had in this year 1606, well cleansed their ditches and common sewers; and flood-gates were made in Holborn ditch and Fleet ditch." He afterwards goes on to inform us that "at this day, 1720, there be no ditches or boggs in the city except the said Fleet ditch, but instead thereof large common drains and sewers made to carry away the water from the postern gate between the two Tower Hills to Fleet bridge without Ludgate."

Before leaving the subject of sewerage, we may observe that the state of the Thames received special attention from our ancestors. In the time of Henry VIII, heavy penalties were imposed on those who contaminated the river by throwing soilage and offal into it. These substances were to be conveyed away in dung-boats to convenient places, to be appointed by the city authorities. Times, indeed, are changed. One of the great problems of the present age admitted then of an easy solution.

The water-supply of the citizens was first obtained from the natural brooks and wells which existed within their precincts. Of these there were several. Besides the river of Wells, which afterwards obtained the name of Turnmill brook, and its tributary the Old-Bourne, there was Wall brook, which entered the city near Moorgate, and, after various windings, fell into the Thames; then Langbourne, which rose in Fenchurch Street, and, running with a swift course west down Lombard Street, broke into many rills before its termination in the river. Together with these, there were the delicious springs of the suburbs. "There are," says an old writer, "on the north part of London, principal fountaines of water, sweet, wholesome, and cleere, streaming forth among the glistering pebble-stones; in this number Holy Well, Clerken-Well, and St. Clement's Well, are most famous, and frequented above the rest, when the schollers and the youth of the city take the air abroad in the summer evenings." As early, however, as the

reign of Henry III, this primitive water-supply was found insufficient. In order "that the poor may drink, and the rich may dress their meat", the first water was conveyed from the town of Tyburn by pipes of lead into the city. A great leaden cistern, castellated with stone, to which the name of the great conduit was given, was erected in West Cheap for its reception; and other works of a similar nature followed. The water of the Thames was also used for domestic purposes; and the right of passage through the lanes which led to the river was held with tenacity by the citizens, in order that no interruption might be given to its carriage. To a Dutchman belongs the honour of first raising the Thames water and conveying it to the houses of the inhabitants by means of pipes; which he did by a mill, called in Stow "a most Artificial Forcier, standing near unto London Bridge." The name of the worthy Dutchman was Peter Morris, and the year of his achievement was 1582. He astonished the Lord Mayor and aldermen, when they came down to see his works, by throwing the water over St. Magnus' steeple. The water conveyed by this mill was long in use, and was deemed much clearer and finer than that supplied by the New River. This last named source of water-supply was brought to London in the year 1613, by Mr. Hugh Middleton, from the springs of Amwell and Chadwell; and it must have been of inestimable benefit to the metropolis, for its want was severely felt in the preceding reign. Queen Elizabeth had granted an Act of Parliament for the purpose of cutting such a river, but the project was dropped at her death.

We must now turn our attention from the water-supply to the habitations of our ancestors; introducing, as we go along, some few remarks on their modes of living.

The dwellings of the middle and lower orders in the Anglo-Norman times were constructed of wood, with plastered walls and thatched roofs. When inhabited by those whose circumstances were above poverty, they consisted of one large apartment with several smaller ones grouped around it: but the cottages of the poor contained only one room. The fire was made on a hearth in the centre, and the smoke found an exit through a central hole in the roof, or through the window when it existed. The houses in London were of this build, and about sixteen feet high. These apartments must have been as frequent a source of *lippitudo* as the smoky habitations which Lord Dufferin describes in Iceland. That such an effect was produced, we learn from Longlande, who wrote in the fourteenth century, and, although deploring the modern civilisa-

tion which had introduced chimneys, has left a testimony as to the discomfort of the primitive arrangement.

"Ac, when smoke and smorthre smyt in hus eyen,
Hit doth hym wors than hus wyf other where to slepe;
For thorw smoke and smorthre smerteth hus syghte,
Tyl he be blereyde othr blynde, and the borre in hus throte;
Kowgheth and corseth that crist ȝgive hym sorwe
That sholde brynge yn bettere wode, othr blowe til hit brente."

It is true that some chimneys were constructed in the stately castles of the great Norman barons, but several generations passed away before the peasantry and artizans departed from the style of their Saxon forefathers.

In Pierce the Plowman's Vision (from which the above is a quotation), it is a matter of complaint that the lord and lady abridged the ancient hospitality by leaving the smoky draughty hall, and retiring to a "privey parlowr," or a "*Chaumbre wyth a chymeney.*"

Many of the wretched cabins were destitute of windows. When these existed in the residences of both rich and poor, they were so small as to be almost useless, and lamps or candles were burned during the day. These eye-holes, as they were called by the Anglo-Saxons, were closed by linen or wooden lattice, or sometimes by thin plates of horn; glass was rare even in the castles of the conquerors. The ventilation of the habitations of both rich and poor must have been at a minimum, and to this probably is to be ascribed the love of perfumes which was so general. Fumigation was constantly and solely used as the means of purification and disinfection, and its substitution for fresh air was an error long adhered to both by the public and the profession. Witness the advice published by the College of Physicians, as late as the plague of 1665, where it is recommended that "Fumes of rosin, pitch, tar, turpentine, frankincense, myrrh, amber; the woods of juniper, cypress, cedars; the leaves of bays, rosemary; to which, especially to the less grateful scented, may be added somewhat of labdanum, storax, benzoin, lignum aloes; one or more of these as they are at hand, or may be procured, are to be put upon coals, and consumed with the least flame that may be, in rooms, houses, churches, or other places." But not one word is said about admitting any of the pure breath of heaven into the pestiferous apartments.

We regard the spread of the doctrine that fresh air is the best antagonist of disease, as the great sanitary improvement of modern times. Nearly every other of the acknowledged hygienic laws was recognised in greater or less degree, in past ages; but on this point our forefathers seemed completely ignorant. The belief in this truth has gradually been gaining

ground since the time of Sydenham; but even now its vast importance is not fully appreciated, and it may be that its noblest triumphs are reserved to be witnessed by a future generation.

In the one-roomed huts of the lower orders, old and young slept round the central hearth. When a sleeping apartment existed, it served for the whole family, of whom several reposed in one bed. In the time of Chaucer, the packing system of the lodging houses in St. Giles's obtained in all respectable hostelries. That any traveller should have a room to himself was a mark of distinction; and down to a very late period, in farmhouses, inns, and servants' apartments, one great platform, sloping slightly from the head to the foot, served as a bedstead for a large number. A piece of furniture of this description, capable of accommodating fifty-two persons, existed till the middle of the last century at an ancient inn, the "Crown," at Ware, in Hertfordshire.*

To the crowding of students in the dormitories of the Universities, the great mortality occasioned by epidemic disease amongst them was doubtless rightly attributed. Thus, in 1448, when pestilence devastated Oxford, its great fatality was ascribed to "the lying of many scholars in one room or dormitory in almost every hall, which occasioned nasty air and smells, and consequently diseases."

The bed-rooms of the aristocracy possessed neither hearth nor flue. The tall narrow window was filled with oiled linen or glass, a part of which could be opened in the manner of a cottage casement, and the sweetness of the apartment was provided for by the burning of spices. The bedstead and furniture were luxurious for the age: a feather bed and pillow were laid on straw spread on the bed-laths, and "blanketts of fustyane" and "shetes of clothe of rayne," protected the sleeper. Over the bedstead a gilded cage hung aloft

> "With long peper fayre burning,
> And cloves that be swete smellyng,
> Frankensence and olibanum."

The state of the streets in great towns was such as would exist in the cities of the East in the present day, were it not for the sanitary labours of vultures and dogs. Reference has been already made to the proclamation of Edward III as to the removal of slaughter-houses to Stratford and Knightsbridge. It is evident that but little good effect resulted from so excellent an ordinance, for we find that in the reign of his successor, Richard II, a similar one was promulgated. The original proclamation sets forth that "By reason of killing of

* Twenty six butchers and their wives slept in it on the night of the coronation of William and Mary.

great beasts from *whose putrified blood running down the streets*, and the bowels cast into the Thames, the air in the city is very much corrupted and infected, whence abominable and most filthy stinks proceed, sicknesses and many other evils have happened to such as have abode in the said city, or have resorted to it; and greater dangers are feared to fall out for the time to come, etc." The reader will not wonder that the ancient name of the passage in which the Hall of the Butchers' Company stood was *Stinking Lane*. For evidence of the state of the streets in the middle ages we may turn again to the town of Oxford. "In 1300 the University complained to Edward I, that the great store of filth lying in the streets corrupted the air, and destroyed the health of the scholars. In the king's breve, the townspeople are ordered to repair and mend the floor or pavement of the town, in every street and lane; to remove all filth lying in them, also the hogs which did increase it; and the sheriff was to cause the burghers to do the like before their doors. Six years afterwards, another complaint was made to the king, that the regrators burned stinking fat and suet before their doors, which so corrupted the air, that the scholars were often sick, and by the smell brought into infirmities. Edward III compelled ecclesiastical persons to repair and clean before their doors, as well as laics, from which they had claimed an exemption." "In 1338 a complaint was again made to the king that dung, garbage, and other filthiness lying in streets, lanes, and alleys, had so much infected the air, that not only nobles, but others of inferior note did decline coming near the town, and scholars and burghers were overtaken with infirmities of body, and many had died." Any one who will examine the ancient statutes of the streets of the city of London, will find that in the middle ages passengers were exposed to the same annoyances as those which even in modern times disgraced the capital of the north. The minuteness with which offences against cleanliness are particularised, is sufficient proof that these regulations were made to remedy existing evils.

Although, as we have seen, the people of England for ages shewed but little antipathy to the existence of smoke in their dwellings, they were curious in their choice of the particular fume. Coal smoke was especially abhorred. Coal first appears as an article of commerce about the end of the twelfth century; and about a hundred years later, it was imported into London for the use of brewers, dyers, smiths, and others. Up to this time wood, turf, peat, and charcoal were the only articles of fuel. The coal innovation produced a powerful outcry; it was dis-

covered that its fumes corrupted the air, and were prejudicial to health. The citizens complained through parliament to the king in 1306, and petitioned for the prohibition of its use. The consequence was a royal proclamation, and afterwards a commission to ascertain who burnt sea-coal within the city and in the neighbourhood, the first offence being punishable by fine, and the second by the demolition of the furnaces. The custom, however, continued without any abatement in the opposition it had evoked, and at last it was made a capital crime. Documents still exist proving that a man, in the reign of Edward I, was actually tried, condemned, and executed for burning coal in the city of London. The opponents of the smoke nuisance were certainly in earnest in those days.

Sir William Petty, writing about the year 1660, attributes the increased unhealthiness of London to the universal use of sea-coal, which he says was little used sixty years before, "For I have heard," he writes, "that Newcastle is more unhealthful than other places, and that many people cannot at all endure the smoak of London, not only for its unpleasantness, but for the suffocation which it causes."

Other and more potent causes of disease than the smoke of the sea-coal existed without the walls of the ancient city. Although on the north side, as Fitzstephen writes, were "fields for pasture and open meadows very pleasant, into which the river waters do flow, and mills are turned about with a delightful noise", the greater part of the suburbs of London consisted of marshy ground. The ancient history of Rahere, the founder of St. Bartholomew's Hospital, informs us, when speaking of its site, "Truly thys place (aforn his clensynge) pretendid noone hope of goodnesse. Right uncleane it was; and as a maryce dunge and fenny, with water almost ev'y tyme habowndynge." Moorfields was a vast swamp across which the citizens built causeways, by which they reached the suburban villages of Hoxton and Iseldon, and where, in the winter time, "the young men sported on the ice, binding to their shoes bones and holding stakes in their hands, headed with sharp iron, which sometimes they strike against the ice, and going on with such speed, as doth a bird in the air, or darts shot from some warlike engine," as we read in the account left by the worthy monk of Canterbury whom we have so often quoted. It was not until the sixteenth century that "this fenne or moore" was converted into "maine and hard ground." On the west, Westminster was surrounded by marshy land; occasionally high tides swept over Parliament Street, and in consequence of such inundations knights and barons have riden on horseback into

Westminster Hall. From the abbey to Chelsea the country was again a swamp; as late as seventy years since, snipes were shot over the sites of Eccleston and Warwick Squares. Besides these, there were the great marshes of Essex bordering on the Thames and Lea. When all these sources of malaria are taken into consideration we need not wonder at the "hoat agues" and fluxes which we so frequently read of in the Chronicles. The father of English medicine has occupied a large part of his great work in treating of the intermittent fevers of London, which appeared as regularly as the temperature of the marshes in its neighbourhood was changed by the spring tide sun and the autumn breeze. From being one of the most common, ague, in the present day, has become comparatively a rare disease in the metropolis; and there is the best ground for believing that it, with all its kindred of periodic affections, might be completely banished the community.

Before quitting the subject of early English habitations, we must allude to a practice which seems to have been peculiar to the nation. It was that of strewing the floors of their rooms with sedge or fresh rushes, or, when these were not procurable, with straw and hay. This ancient custom, which obtained in Anglo-Norman times, as the account of the housekeeping of Thomas à Becket proves, continued to the Tudor era. In the frequently quoted letter of Erasmus to Dr. Francis, the physician of Cardinal Wolsey, the continual plague and sweating sicknesses are partly attributed to the filth and slovenliness engendered by this usage. "As to the floors," he says, "they are usually made of clay, covered with rushes that grow in the fens, which are so slightly removed now and then, that the lower part remains sometimes for twenty years together, and in it a collection of beer, stale food, and other filthinesses not to be named. Hence, upon a change of weather, a vapour is exhaled very pernicious to the human body." From the same letter we learn that, although large windows had been introduced, the sides of the rooms being glazed with small panes, ventilation was but little improved,—the air obtained entrance only through chinks, the main object being to admit light and exclude wind.

There was one circumstance connected with the huts of our forefathers which we are tempted to regard as their only advantage,—it was, that they were easily burnt down. Despotic as the measure seems, we cannot wonder at the curfew. Fires had become so frequent in London, in the times of the Plantagenets, that Richard I. ordered that, in future, all houses in the city should be built to a certain height of stone, and

covered with slates and burnt tiles. Yet up to the period of the great conflagration of September, 1666, wood was the chief material employed by the lower and middle orders. That great event in sanitary history, which destroyed the dark lanes and noisome alleys, where plague and fever had lurked for ages, ushered in a new epoch. In the whole history of our country no temporary calamity has ever been attended with such lasting benefit. Yet, although the improvements in the new city were great, they were not what they might have been. Had not selfish councils and vested interests interfered, London would, at the command of England's greatest architectural genius, have risen from her ashes to rival in magnificence the capitals of oriental despotism, and to surpass in beauty the fairest cities of Italy.

We must not linger to give a detailed account of the food of our ancestors. We can only indicate two great errors in the diet of even the better classes, which must conjointly have been productive of disease. One was, the constant consumption, for a great part of the year, of salted provisions; the other, the sparing use made of fresh vegetables and fruit. Peas and beans were almost the only vegetables used for centuries after the Norman Conquest, besides those chiefly employed for their flavouring qualities, such as potherbs, onions, leeks, and garlic. In the thirteenth century, as may be gathered from the household roll of Bishop Swinfield,* a great part, both of the butcher's meat and of the venison consumed, were salted; and in the reign of Henry VII. fresh meat was a luxury untasted even by gentlemen attending upon a powerful noble, except between Midsummer and Michaelmas. In the times of the later Stuarts the Martinmas beef, as the winter stock of salt provision was called, was universally laid in by families in the beginning of November.† We learn from the authority above quoted that the major part of the fruit brought to the tables of the great was foreign,—as dried figs, almonds, raisins, and nuts. Greens were used pickled or salted. Not only the potato, but the turnip, are of comparatively modern introduction. In the letter of Erasmus before referred to, he alludes to the prejudicial effect of the immoderate use of salt provisions on the health of the English. We need only add, that deaths from scurvy were always returned in the earlier bills of mortality, and in the reign of Charles II. were considerably on the increase.

* A Roll of the Household Expenses of Richard de Swinfield, Bishop of Hereford. Edited by the Rev. J. Webb. Camden Society: 1855.

† Macaulay's History of England.

At the commencement of this article we asserted that eras of pestilence had been emphatically the eras of hygienic measures. One or two more illustrative facts will perhaps give it a fitting termination. In what were the suburbs of ancient London, there is a district which still preserves something of its former air of solitude and quiet, amid the noise and tumult which have for five centuries been gradually gathering round it. In the reign of the third Edward, it was a piece of waste land belonging to the brethren of St. Bartholomew's Hospital, and situated outside the bars of Smithfield, at some distance from the city wall. When the black plague, after advancing with rapid strides over Europe, numbering in every community its victims by tens of thousands, had at length reached the sunny western shores of this island, there were in London two public spirited men who, foreseeing the fate that overhung the doomed city, determined to provide the means of extramural sepulture. These were Sir Walter Manny, the noble Hainault knight, companion-in-arms of Edward and the Black Prince, and Ralph Stratford, Bishop of London. Two pieces of land, adjoining each other, were purchased; that by the bishop in 1348 was called "No Man's Land," and in Stow's time was a fair garden, retaining the name of Pardon Church-yard; that by Sir Walter, in the following year, was named Spittle Croft, from its being the property of the hospital, and was in extent thirteen acres and a rod. Both these fields were duly consecrated for burial. In the latter, Stow adduces not only the charters of Edward III, but also an inscription on a stone-cross erected in the church-yard, to prove that fifty thousand persons, during that fearful epidemic, found their final resting-place. For twenty years the ground was used as a burying-place for poor people and travellers, according to the benevolent will of the purchaser, who built there a chapel, and afterwards founded a priory of Carthusian monks; adding to their possessions Pardon churchyard, long afterwards the last home of those who had forfeited their lives to the law, or had desperately ended them. After the dissolution of monasteries, the house, "a very large and goodly mansion, beautified with spacious gardens, walkes, orchards, and other pleasures, enriched with divers dependencies", was purchased of the Earl of Suffolk by Thomas Sutton, for the purpose of founding a hospital for eighty poor persons and forty scholars. Such, in few words, is the history of the Charterhouse, a locality endeared to every lover of modern English literature by the truthful fiction of Thackeray and the classic page of Washington Irving.

We have here, then, as early as the fourteenth century, a

recognition of the necessity of extramural burial, at least during a time of great mortality. The old historian, so often quoted, expressly says that Sir Walter Manny made his purchase "in respect of danger that might befall in this time of so great a plague and infection." It was not so much out of care for the dead as on account of harm that might accrue to the living, that he carried his purpose into execution.

It is a well-known fact that in succeeding epidemics those vast receptacles of the dead—the plague pits—were made at a distance from the habitations of the people, and even in country villages it was ordered, in Queen Elizabeth's time, that places should be appointed apart in each parish for the burial of such as should die by pestilence. The testimony of one of the early bishops of the Reformation has been lately adduced in a court of law in favour of the practice of extra-urban sepulture.

In connection with the subject of the black death we may add, that we would refer any reader, who may be sceptical as to the amount of the depopulation it produced, to an article by Mr. Amyot in the twentieth volume of *Archæologia*, on the population of English cities in the time of Edward III. It is worth noticing that, within a comparatively short period after its subsidence, the king granted its first charter to St. Bartholomew's Hospital. A similar coincidence occurs in the history of St. Thomas's; it was purchased by the citizens in the year succeeding the last epidemic of sweating sickness, 1552, for "poor, impotent, lame, and diseased people." For centuries these were the only two institutions for the reception of the sick of all diseases in London.

It was at the time of plague visitations that the excellent "statutes of the streets of the city against annoiances" were put in force. Thus, in 1656, the College of Physicians, by royal authority, recommended "that the statutes and good orders made and formerly published against common beggars, against *plaies*, bowling allies, inmates, tippling houses, lestalls, against the sale of corrupt flesh or fish, may be revived and strictly executed, and that the skavengers in generall, and euery particular householder take care for the due and orderly cleansing of the streets and priuate houses, which will auaile much in this case."

Then follows a direction for the extermination of "dogges, catts, conies, and tame pidgeons, and that no swine may be permitted to range up and down the streets as they frequently doe, or rather, not to keepe any at all;" the notion of the time

being that infection was capable of being conveyed by domestic animals.

Again, in the orders for health, it is enacted that "every householder do cause the street to be daily pared before his doore, and so to keep it cleane swept all the week long. That the sweeping and filth of houses be dayly carried away by the rakers, and that the raker shall giue notice of his comming by blowing of a horne, as heretofore hath beene done. That the laystalls bee remoued as farre as may be out of the city, and common passages, and that no night man or other be suffered to empty a vault into any garden neere about the city." These are succeeded by orders against the sale of unwholesome meat, fish, and musty corn.

Similar directions were published at each visitation, together with others for providing necessaries and medical attendance for the sick, for burning such clothes and bedding as had been used by them, for which, in cases of poverty, allowance was ordered to be made, and against the sale of such articles as were believed to be capable of harbouring the *materies morbi*. As may be supposed, the grand error was the barbarous and useless shutting up of infected houses, by which every chance of escaping the disease was cut off from those who were immured, and, as the prodigious mortality shows, without the least good effect in lessening the spread of the epidemic. Yet this was done by the direction and under the sanction of the men of science of the day, and is the best proof of that lamentable ignorance of the necessity of free ventilation in combating disease to which we have before alluded. But the year 1660 gave birth to the Royal Society; the era of Newton, and Boyle, and Halley, had arrived; the philosophy of Bacon was at length put to the test; and an impulse was given to the advance of science, whose force the roll of years and the succession of generations have served but to augment. For the nineteenth century it has been reserved to apply her results to the requirements of social existence. Although in the city—so dear to all Englishmen—we no longer look for the quaint picturesque of a former age,—the pointed roof, the overhanging gable, and the grotesque carving,—yet, following the guidance of advancing knowledge, and tutored by the experience of the past, we do and shall hail within her a healthier, happier population than existed in the time when her maidens sported round the May-pole on Cornhill, and her pale students sauntered in the summer twilight beneath the green foliage shadowing the pleasant walks about Gray's Inn.

THE EPITOME OF SANITARY LITERATURE.

THE past quarter, although the great publishing quarter, has brought forth but few books bearing specially on sanitary science; and from such as have been published, we have but space to select two or three for analytical remark.

Dr. Aitken* has brought out an admirable *Hand-book of Medicine*, which we strongly recommend to our medical readers, and to such general scientific readers as are interested in the advancement of the curative art. There is a novelty in this work, in the fact that the author has accepted Dr. Farr's classification of diseases, as adopted by the Registrar General. We have already expressed an opinon in reference to this nosological system. In the last part of the work there is an excellent description of the geographical distribution of disease, after the plan of Mr. Keith Johnstone.

M. Baudens has published a work on the *Sanitation of the French Army in the Crimea*, which is full of valuable details. It must be reserved for a future occasion.

Dr. Cockle,† in an eloquent and thoughtful address on *General Pathology*, delivered before the students of the Grosvenor Place School of Medicine, indicates the relationships of pathology to the geographical distribution of disease. The following quotation is in point:—

"Pathology creates, as it were, the necessity of a Medical Geography, by its inquiries respecting the direct influence of soil and climate upon the duration of life, as well in accelerating as in retarding the progress of given diseases. Indeed, this latter science bids fair to take a position of the highest order, and has already determined some remarkable results. I shall cite one or two of such from the recently published work of Boudin. He says there are some types of races which appear to adapt themselves to climatic change in a wonderful manner, while others again scarcely endure the slightest alteration of habitat. The Jews may be cited as examples of the first order. They are, at present, spread over all parts of the world. In Europe they are found from Gibraltar to Norway; in Africa, from Algiers to the Cape of Good Hope; in Asia, from Cochin to the Caucasus, and from Java to Pekin; in America they are met with from Montevideo to Quebec. For the last half century they have become residents of Australia, and have given proof of being thoroughly acclimatised under the tropics,

* Handbook of Medicine. By W. AITKEN, M.D. London: Griffin. 1857.
† Introductory Lecture to a Course of General Pathology. By JOHN COCKLE, M.D. Pamphlet. London: T. Richards. 1857.

where a population of European origin have constantly failed to perpetuate themselves. The Jew has also lived through a long series of ages, and still lives, upon the only point of the globe, the valley of Jordan, situated more than 4000 *mètres* below the level of the sea; a spot where it becomes matter of doubt whether the European could ever propagate his race. Finally, wherever the Jewish race has been studied to the present time, the statistical laws of births and deaths, proportion of sexes, etc., which affect it, have been proved to be completely different from those which preside over other nationalities in the midst of which it resides.

"In opposition to this cosmopolitanism of the Jewish race, look, on the other hand, to the continuous decrease of an European population in all tropical countries, and to the impossibility, hitherto ascertained, of perpetuating itself in Egypt and several other parts of Africa. In the tables published by the French Minister of War, the mortality of the population, which in France is 24 in 1000, and which, in 1849, notwithstanding the cholera, did not even attain the proportion of 28 in 1000, has increased in Algeria in the following proportion:—

	Deaths in 1000.
1848	41
1849	101
1850	70
1851	64
1852	55
1853	47

And so late as 1854, the last year that reports have been published, the deaths among European population amounted to 7025, while the births were only 6111.

"Still to linger in this interesting field one moment longer; how curious is the law of antagonism that appears to exist between ague and consumption. Dr. Green, of Whitehall, in the province of Washington, United States, where intermittents are of unusual frequency, declares that there did not exist one single instance of phthisis developed in the district; and that the consumptive invalids arriving there experienced a relief as decided as it was permanent. The same author also states that a morass near Rutland, having been converted into a pond, the intermittent fevers disappeared from that part of the country, and were replaced by pulmonary consumption. The population having solicited and obtained the suppression of the pool, or, what amounted to the same thing, the re-establishment of the morass, the original agues returned and antagonised the development of phthisis. These facts are supported by the experience of many other competent observers. I need not say that they demand your serious consideration, especially at a period when human migration is going on on so large a scale." (pp. 11-12.)

ORIGINAL COMMUNICATIONS.

THE MEDICAL PILGRIM'S PROGRESS:

BEING THE INTRODUCTORY LECTURE DELIVERED AT THE GROSVENOR PLACE SCHOOL OF MEDICINE, OCT. 1, 1857.

By BENJAMIN W. RICHARDSON, M.D., L.R.C.P.;
Physician to the Royal Infirmary for Diseases of the Chest; and Lecturer on Physiology and Public Hygiene at the School.

GENTLEMEN,—My colleagues have done me the honour to ask me to speak the first word, on the opening of this medical session. I accept the task with much pleasure and some anxiety; for, while it is difficult to invent new ideas or new topics for the subject matter of an introductory discourse, it is still more difficult to repeat what has been so often spoken before, with so much of eloquence, force, good taste, and feeling.

I asked the colleague who moved into my acceptance this pleasing duty, what I should say to you? His reply was indicative of the practical surgeon—"Give them something that they can see." Well! I have cast about for some subject of the kind suggested by my friend; but, as I see nothing myself of the illustrative type befitting the occasion, and demonstrable to the visual sense, it were vain for me to call your attention to this experimental wonder, or that surgical weapon. I must therefore be content to deal simply in thoughts and suggestions, in hopes and outshadowings; and you must be content to see while you hear. A vision of words is before you.

But who are before me? A students' assembly? No—yes. I hope a students' assembly always, and I the youngest of all. A student need not be a man; but a man, to be a man, must be a student. *Ergo*, we are all students. But some are students only,—others are students who have passed their pupilage. With the latter I shall have nothing to do this day, unless they choose to accept the student's simple position. The pure student, the elementary student, is my man now; the rest are hearers. I shall therefore address myself to my audience in elementary language, speaking boldly what I think, but simply, that the youngest may understand.

These preliminaries settled, and a proper understanding made, you await the theme. What is to come?

By rule and plummet, as I am advised, it would be a right thing to begin with a word about this very school; a word, of course, in strong commendation of this school, and of your discerning faculties; and all that—Society for the Promotion of Mutual Applause. On this topic I must, for the sake of

good taste and feeling, be brief and honest; and so I say candidly that, while every student who enters this school can learn his profession if he will, so he can also learn it in other schools if he will, since the will is the royal way. Further, I would add that it is the student who makes the school, not the school the student. Whichever one of you, educated in these walls in past times, now, or in future, shall make for yourselves an honest reputation, and for the world a benefactor, in so far shall such an one make this place renowned and its teachers celebrated.

You expect me next, possibly, to say a great deal about the profession which you have chosen; and this of course in strong commendation of the profession and of your discerning choice, and all that—Society for the Promotion of Mutual Applause again—Limited Liability this time. The Society fails once more. I am not going to admit that, by comparison, medicine is second to any profession; though this negation says but little for physic. I am not going to preach to you the weak points of our science; for these you will learn soon enough for all practical purposes; but I am going rather to try to show to you who are to be the after-day representatives of medicine, on what the future greatness of medicine must be based—what you must live for, and hope for, and die for, if you would set the seal of merit on the work of this day.

THE MEDICAL PILGRIM'S PROGRESS—That is my theme.

And, as I stand here holding a trust which is as solemn as it is honourable, so is it my business to discharge that trust with true honesty of purpose as of word. There must be no misunderstanding between us. It must be assumed that you are anxious that the result of your pilgrimage shall end in success; and I must endeavour to set you forth fairly on your journey; so that, knowing the worst, you may be ever striving after the best.

You have doubtless all come to this new work with grand anticipations and resolutions. Rattling up to this modern Babylon, your enthusiasm has been raised to its full pitch. The train came not fast enough, while your hearts kept rapid harmony with your thoughts. The enthusiasm is healthy, and must not be checked, but directed rather into its right course; and this not for your own personal interests merely, but for the interest and honour of medicine as a profession.

Know then, that in expending your enthusiasm in the medical journey there are two paths that you may follow—the one broad, easy, and delusive—the other narrow, difficult, and uninviting, but the only true.

In the broad and easy path there are already numerous wanderers; for, as I say, the prospect is as tempting as it is false. The wanderers are in groups or classes. Let us inspect a few of them.

First, there is the great class of men of means. These can give *fêtes* to their fellows, and trust to their "governors" in all emergencies: moreover they can fight against time, and wait until something turns up to their advantage. These men, born with the celebrated silver spoon in their mouths, arrive sometimes at envied positions, which, by the way, they rarely sustain. Taking them all in all, they are not to be envied, when the best is said for them. They are the spoiled children of fortune, and are generally dissatisfied with themselves and everybody. Born not to work, they work *per* force, despising the labour of their own hands, however meritorious it may be. Born to the luxury of idleness, they are ignorant of the luxury of industry. Born to exercise from their cradle a petty rule, they grow up captious, supercilious, insolent. They form, in a word, the class which I shall designate the *Young Ladies in Physic*. Ready made vinegar, as Chemist Punch teaches, may always be obtained by praising one of them to another; and, so long as they remain unticketed amongst the extinct animals, Miss Blackwell, M.D., need, I take it, make no further proselytes.

There is another class in the broad highway; the men of this group aim at creeping towards distinction, not by their industry, but by the ignoble project of recognising the weakest of all human traits—the vanity of their fellows and their superiors, and by paying insincere deference to that vanity. These take to heart the modern poet's axiom,

> "That bowing down, and bowing down,
> Is the way to get on in London town."

They act on this motto, and too often they find it answer. Now observe, that in marking out these men, I am not insinuating a thought against the honest admiration of great and good men; but I am speaking against any attempt at progress through false adulation of the little great; and against that class of persons, whom I brand as *the Toadies in Physic*, to distinguish them from all others, and from the *young ladies* in particular.

Once more, and not to go further into detail, there is on the broad and easy way, a group of strolling idlers of a tawdry and mean caste; the drowsy, helpless, care-for-nothings, ne'er-do-wells. These men take things as they come, and let them go as they go. "They muddle away their incomes in paying their debts." The sun rises and sets on them; but what to

them is the sun, except as a sort of necessary, and sometimes unpleasant flunkey? Often dissolute from the first, they become mere non-entities at last; they drawl on, deriding a progress they cannot follow, and die as if they had not been born. Why they were ever born is a dead secret; but born they are in great numbers, and, in my language, they furnish the class called the *Old Women in Physic*, which Miss Blackwell, M.D., very much and very properly despises.

You, none of you, wish to rank either with the *young ladies*, the *toadies*, or the *old women*, do you? Not a bit of it. Then let us leave them altogether in disgust, and pass from their highway to the difficult but manly route.

The narrow but difficult path in medicine is rendered sacred by the foot-prints which have indented it. Here trod Hippocrates. Here held he converse with the air, and the clouds, and the floods; with man in death, with man in birth. Here he drew up and transcribed those tablets which we retain with so much pride and admiration, and read to-day as though they were written but yesterday. Here Vesalius, with stout heart and unwearied step, moved on, climbing even the gibbet for the wherewithal for study, and stealing anatomy, and making it a science amidst the clamours of a stupid, ignorant, and superstitious community. In this path walked William Harvey, avoiding no ascent, however difficult, and gaining one at last which threw open to his vision, a new world. Here that child of the chisel, John Hunter, strove, and by unfailing energy proved, almost for the first time in the history of intellect, that genius may be a mere child of industry. Here, in a sentence, has every man who may be nominated a master in physic striven; and here, too, must you strive.

Does any one feel that the course thus marked out is too hard for common men; that genius is required for it, Herculean power, more strength than such an one possesses? The feeling is good; but blend with it no misgivings, for, as many a coward grows bold in the wars, so the weak, because untutored mind grows stronger and stronger as the labour of intellect grows more severe.

We often have to listen to a great deal of talk about genius; about the force of genius, the fire of genius, and such like phrases: as though genius were a principle *sui generis;* a kind of mental malformation dependent on a lobule of brain-stuff seated in some special recess in particular noddles. There is nothing of the kind; but there is certainly in some men a happy combination of ordinary mental faculties, which gives to these men a natural aptitude for logical and bold reasoning,

and which sets them above their fellows. Such effective combination is made up of three very simple elements, which we will call *force, fearlessness,* and *fact.* Whoever has these, has the genius for science; and although education alone will never positively supply these elements, yet, as they are more or less inherent in every man, so are they brought out and strengthened by every educational exercise.

Remember then this triplet of faculties, and encourage their natural development in yourselves. Encourage *force* by care, by industry, by knowledge. Encourage *fearlessness* by determining that neither self-love, nor the risk of work, shall prevent you from accomplishing any honourable and possible task. Encourage *fact* as the keystone of your force, and your fearlessness; and you will be the representatives of genius beyond expectation.

But remember this also, that genius will not show itself by your constantly thinking about it, or by your fostering the notion that you are the sepulchres, or very mines of the great hidden treasure. *The Genius Angel in these days sets no kisses on the lips of babes in long clothes.* No, no. It is the faculty of true genius to know nothing of its own life. "What particular quality of mind led you to your victories?" was a question once asked of him whose statue is not a stone's throw hence "Common sense," was the immediate and honest reply. The hero of a hundred fights laid no claim to the special faculty. His successes rested on the three principles already named—force, fearlessness, and fact; combined, these constituted his common sense; and on them his fame rests after him.

Grasping then manfully the pilgrim's staff, and setting your feet in the right way, you must inure and qualify for your journey. You must prepare yourselves physically; you must prepare yourselves mentally. I mean by this, that you must learn so to govern the body as to bring it into healthy concord with the mind; for mind is in a great measure based on body. It is not my intention to read you a sermon on morals; for I accept you all as gentlemen in the full sense of the term, and a true gentleman is a man of morals: therefore I speak not of morals, but of physical training; of the development of muscle, and bone, and lungs, and heart, and brain; since your mind can only attain its full power, or retain it, while these physical forces are in working order.

Not to be wearisome, I will give you one general precept, which is the key to a thousand more. *Carry simplicity of life to the boundary of abstemiousness.*

As an architect can, if he will, build this house of stone,

that of wood, and the other of brick; so can a man, by what he takes in, build up his ever-changing house of a body as he will, or nearly so. And as he builds, so in a great measure does he extend or narrow the power of his intellect. If he overbuild, or imprudently build, his mind pays the forfeit. Imbecility is the first-born child of luxury. I need not stay to prove this fact, it is so evident. In the history of men as individuals, as families, as nations, it is the one prominent truth. On the other side, the history of men as individuals, as families, as nations, proves with equal force the truth, that strength and vigour of intellect are inseparably connected with simplicity of the corporeal life.

We talk largely about the blessings of luxuries and creature comforts. But what positions do these bear in their influence on the world when compared with their opposites? They are idiots only who connect force with material wealth. On the contrary, there is not a single intellectual triumph, at all god-like in its magnitude, that has not arisen out of the so called *poverty* of this little earth; from the souls of men who, reared not in the lowest phases of deprivation, but far enough away from luxury, grew up having the powerful mind, blended with the simply nourished but healthy physical body.

I beg you, therefore, as you would advance rapidly, to make simplicity of life your first point. Brush up your recollections of the men whom you would most wish to imitate, and let their habits and practices guide yours.

You have heard, doubtless, of a certain great American patriot, named Benjamin Franklin, the man who first captured the lightning flash, and suggested the wire conductor which runs down your village spire; a man of genius this Franklin, —a mere working printer in his early days, and an immortal printer in those latter days when he became the political star and the glory of his country. There is a characteristic anecdote related of Franklin, which will bear repetition. When young, he established the *Pennsylvania Gazette*, and soon afterwards found occasion to remark with some degree of freedom on the public conduct of one or two persons of high standing in Philadelphia. This course was disapproved of by some of his patrons, who sought an opportunity to convey to him their views on the subject, and what they represented to be the opinion of his friends. He listened patiently, and replied by requesting that they would favour him with their company at supper, and bring with them the other gentlemen who had expressed dissatisfaction. The time arrived, and the guests assembled. He received them cordially, and listened again to

their friendly reproofs of his editorial conduct. At length supper was announced; but when the guests had seated themselves around the table, they were surprised to see nothing before them but two puddings made of coarse meal, called "sawdust puddings" in the common phrase, and a stone pitcher filled with water. He helped them all, and then applied himself to his own plate, partaking freely of the repast, and urging his friends to the same. They taxed their politeness to the utmost, but all in vain; their appetites refused obedience to the will. Perceiving their difficulty, Franklin at last arose and said:—"My friends, any one who can subsist upon sawdust puddings and water, as I can, needs no man's patronage."

As Physiologist, it will be my business some day to show you that this anecdote must be taken only in its comparative meaning, and that sawdust puddings are not fitted for the perpetual food even of philosophers; but the moral of the story is not less striking; and it is the moral that I wish to imprint on your minds. And the moral is this; that a man of simple manner and life can do anything in reason, while a man of luxurious life can only prosper by riding on the shoulders of his fellows.

At the same time, bear always in mind, that frugality is in no way necessarily connected either with meanness, selfishness, or pettiness. The luxurious world may misinterpret you on this point; but mind not the world: it is your debtor, and you are not selfish because you attune your souls to the work before you. Make sure of that.

The great Morgagni, father of pathology, and master in physic, was personally abstemious to an extreme, his biographers say to a fault; and criticise the man for his self-sacrifice. Poor biographers! Poor fools! Why do such critics presume to write? Where would have been the astounding labours of our Morgagni, had he not instinctively fashioned his body to his mind? The work could not have been done in two lifetimes, by nerve more pampered. His industry gave birth to his genius, and his simplicity of manner fostered his industry.

Connected with the physical training of the body, I recommend to you strongly the continued and systematic strengthening of the muscular power. Our profession, lending itself too readily to the Old Wife's stereotype of a doctor, makes a grand and universal mistake in this respect. A doctor may pipe a sentimental song in an elegant carbonic acid depôt, called a drawing room. Yes; that is allowable, although a hearty laugh, which is the most healthy exercise in nature, is forbidden by prim society. The doctor may play a rubber at whist, with

a whining old maid for a partner; that is excusable, unavoidable sometimes. He may mildly go through a dance; but he must not romp or polka; certainly not. He may drink wine after dinner till his head swims; that is essential. He may, in fact, do everything of this kind that is effeminate and enervating; but Heaven protect the man if he ventures to play tennis, cricket, or any other game that shall call into unwonted play his elegant, half-useless, mute-at-a-funeral-clad limbs.

Gentlemen, without encouraging you to any injurious pursuits, I call upon you as the coming representatives of medicine, to disobey the old woman oracle, which dictates these absurd conventialities. Innocent, active pleasures are the salt of life; and the more vigorous the man, the more vigorous the mind. I take it that much of the namby-pambyism, vapidity, and anæmic conceit, which too much characterize all the learned professions, are due to this slow progress of effemination, this undermining of the soul. Go to the British Association for the Advancement of Science—that parliament of intellect! and observe there who are the Science-Hercules. You will find them amongst the men who are most genial, best body-built, least conventional.

As another means of strengthening the physical organism, and of securing therewith the development of mental power, I urge on you strongly, as an amusement, the practical study of mechanical laws. Every lesson here learned is a lesson in practical mathematics; and the manufacture of a mere wheelbarrow by an educated man is worth a dozen problems of Euclid. In addition, the Esculapian has, throughout the whole of his career, to study and treat the most beautifully constructed of all machines; so that the more he knows of practical mechanics, the more he knows of man.

And yet another valuable process arises out of the practice of physical exercise; I mean promptitude in action; readiness, without the feeling of drudgery, to do at once, and to the best advantage, every work that has to be done. "Procrastination is the thief of time"—and nothing so surely produces procrastination as inertia of body. Mental labours in the development of their full force require inevitably some amount of physical industry; and you will find, if ever you come to the exercise of the purest labours of mind, that the preparatory step to each section of work is to throw off an indescribable sensation of physical idleness. My belief indeed is, that the mind is never idle in a strict sense; and that, although brain has to do all the thinking, it is muscle that has to do all the wearying. Physiologically, indeed, this is explained. For,

as every art, physical or mental, is a tax levied upon the respiration and circulation; and as the functions of respiration and circulation are functions dependent on the energy of muscle, so is muscle a prime mover of mind, and so must it the more carefully be kept in full and vigorous force. The men who measure intellect by mere size of head and brain, comprehend but half the physical problem. A finely balanced brain is unquestionably a grand acquisition; but, like a splendidly built bank *minus* an in-going capital, the brain is a poor concern without a good chest and stomach to feed it with its full compliment of oxygen, nitrogen, phosphorus, water, and other brain-bullion.

You have had enough with regard to the physical requirements of your pilgrimage. Now to the mental.

I need not urge upon you that, in the course of the true Medical Pilgrim, industry is the first element. You will remember what has been already said about force, fearlessness, and fact. I will not dwell therefore on this topic, but pass on to other considerations.

Let me forewarn you that, in these days, the science and practice of medicine are passing through a silent, constitutional, and withal a rapid revolution; a revolution so marked, that if in this half of the nineteenth century there is the same amount of progress that has characterised the previous half, the medicine of the twentieth century will scarcely contain a remnant of those principles and dogmas on which the medicine of the eighteenth century was based.

Are you astonished at such a statement? You need not be. The revolution is not peculiar to medicine, but to mind. It pertains to all sciences, to all the affairs of human kind. Step with me for a moment aside; give me your full thoughts, and we will seek for the proof of this theorem in one broad illustration.

Stripping ourselves for the time from this nineteenth century configuration, and unseen garment of mind in which we are enveiled, let some six centuries go by in panoramic dissolution, and let us pass with them into the century yet preceding.

We are British students still. Richard the Lion Hearted, our king, is away with his steel-plated knights to the Crusades, and we remain in the cloister, the science-men of the day. It is a brilliant night in this autumnal season; and we, the presumed interpreters of nature, the vesper song fainting on our ears, carry ourselves to some near mountain-ridge, and discuss according to our knowledge and our dogmas the problems of the

universe. Who is the wisest amongst us, is he that names the stars by their groups or constellations, and fixes a specially prophetic interpretation to the relative positions of those stars which never twinkle. We ask each other, What are stars? and the wisest of us says—"Lights merely to this one and great earth—the whole host but the illuminations of that great earth's ceiling." We speak of the sun as of its parading over this earth for daylight; and of the earth as of a great square of table-land resting on elephant's or tortoise's back. We turn to matter, and pronounce all that we cannot see, nothingness; laughing at those imbecile followers of Leucippus, who persist that matter is ultimately made up of particles that the eye can never reach. The wind wafts over our faces, and we call it the invisible element, the unknown moving force for the mere mariner's sail. We are the scholastic representatives of Richard's reign, and these are our dogmatical faiths. Let no heretic dispute them!

Back from the depths of history again; off with the cloister robe; and fainter the vesper song. The war is in India, not Palestine; and Victoria occupies the throne of the Lion-Hearted. The autumnal night is the same, the stars are the same, the earth is the same, the wind is the same, and we are the same, in that we represent once more the science-men of our day. We will climb the same hill at the same hour, and resume our mutual cogitations. Now on this hill a science-temple has been built, and filled with strange things. But are the stars mere night-lamps now? We place an eye to the tube of Galileo; and lo! the twinkling stars are suns, and the prophetic stars are worlds—worlds like ours. We guage the blue deep beyond and beyond the stars we saw before; and firmament opens beyond firmament, until the illimitable so terrifies us, that instead of our recognising one great world here with stars above for its grand illumination, the world altogether sinks into the infinity of nothingness, and we—even lower. We discourse of the sun now, and call him the motionless; or give to him a grand theoretical circle, which the mind can scarce conceive. We speak of the earth as a ball, and send it whirring round the sun for its seasons, and turning on itself for its day and its night. We turn our thoughts to matter; and behold! the followers of Leucippus are the lords of the argument. We put an eye to another tube, and from the infinity of immensity, we plunge into the infinity of minuteness and divide the unseen, —new worlds in both extremes. The night-breeze wafts over our faces, and we claim it as a known friend. We give to it a local habitation and a name; we give to it weight; we measure

its force; we split it into two portions, definite themselves and well known; and we converse on all those things with one voice as though they had never been doubted, as though they formed part and parcel of the natural knowledge of man.

I have given you these two pictures in striking contrast, that you from them may see the grand revolutions of science, and may learn, in regard to your own section of science the intrinsic folly of binding your faiths inviolably to any dogmas or opinions, saving those which you can read, and mark, and learn on the unrestrained and simple authority of nature.

You think, perchance, that from these reasonings I am persuading you from the study of books. Not at all. It is true I would warn you from what may be called traditional book-learning; for the traditional book-makers are the lions, and sloughs, and sleeping bowers in the Medical Pilgrim's path. But, as books written from the direct observation of nature are guides to the reading of nature from nature, I would by all means recommend such books to your attention, not to supplant the natural study, but to direct it.

You climb Ben Lomond with a man who shows you the way, and who points out the peculiarities of the mountain; but the mountain is seen by your own sense, and you learn it from itself. The guide might not be a man but a book; and the natural study might not be a mountain, but the dead body of a man; yet the positions of the guide and of the natural study are the same.

Do you ask of me—Have we the facilities for this natural course of study? I answer; yes. More facility than for any amount of book study that you can comprehend. You study anatomy. Have you not the veritable book of anatomy in the dead man and his parts? You study physiology. Are not plant and animal in your hand? You study chemistry. Is not the laboratory with its every modern convenience at your disposal? You study the mechanical art of surgery. Is not the dead subject your surgical possession? You study disease; and lo! every phase of disease is brought within four walls for your contemplation. Need I say—yes, I must say, that there is no excuse either in morals or in knowledge, for that student of medicine who in these days is content to take his knowledge of natural things from pastors or masters, when he might take it from the Great Master over all. It is the worship of idols, such work, in the presence of the God of the universe.

Say you that final examination is the ordeal you dread and prepare for? Say you that final examination at College and

Hall is not conducted from nature but from sheep-skin? Do you remind me of the grumblings of the son of a newly appointed old examiner, who, himself a noodle, mourned his hard fate that he had weekly to grind up his father in the bones? Well, I hear all you have to say, and I know its force; but these are my deductions from it: that if you *know* from the natural *thing*, no examiner mortal can pluck you from a reading or a picture; while, if you learn grinder-fashion from a picture or reading, any examiner who will, can pluck, and will deservedly pluck you, from the natural thing.

Thus it is, that I warn you to go always to the originals for your information, and both now and hereafter to be very suspicious about other authorities.

And while you are thus yourselves learners from the realities of science, take care, as you advance into intellectual manhood, not to mislead others by constituting yourselves the authorities of nature. Gentlemen, believe me, there is not a greater quack extant than he who claims to himself and sticks himself up to this distinction. There can be but one authority in science—nature. It is true, a man may discover a natural law, or fact, and make it known; but in the very acts of his discovery and its publication, he resigns all claim to authority, by calling, as he does, on every passer-by to see the fact for himself. Such a man is of the greatest of men; but he would as soon claim to himself the authorship of the natural fact itself, as of its mode of operation.

Your authorities, your *bonâ fide* authorities—your self-enunciating authorities—are men of a cast precisely the opposite to the true discoverer. I will tell you what they are; they are the members of a thorough-going Cockney family, who, walking to the foot of Ben Lomond, pump the guide with note book in hand, straightway return home satisfied with their intimate knowledge of the mountain, and write an authority-description of the prospect from the mountain summit. These are your authorities—they are all to be found in the broad and easy way, amongst the *young ladies*, the *toadies*, and the *old women*—a special great batch, I see, amongst the "young ladies." I beg you never for a moment to cross over to them, for some of them are very seductive—scientific harlots of the first petticoat and brocade.

I repeat, then, that the sciences change, and that medical science is changing specially fast. I repeat that you must follow that change; and now it is my duty to indicate the points of the way, and to explain how you must direct your steps, differently from your fathers.

It was the custom in the olden times, and this custom is not

entirely expunged from medicine, to follow in all medical studies that method of induction which endeavours to arrive at general laws by the enumeration of all particulars. That is to say, taking a simple illustration, it was endeavoured, by collecting all the possible causes of some simple effect, say a disease such as small-pox, and by collecting the histories of a vast number of instances of such effect, to deduce the real cause, by selecting, out of the number of seeming causes, that as the true one which presented itself the greatest number of times, and the most prominently. This line of induction is almost worthless, as any thinking man may see; because, after collecting an immense number of facts, the apparent prominent cause might after all be but a coincidence, or a consequence. The cause thus assumed was, therefore, not a proven cause, but an assigned one.

It remained for the illustrious Lord Bacon to illustrate the feebleness of this principle of inquiry, and to introduce another inductive system which bears his name, and which is based on the assumption, that as in nature everything is uniform and stable, and as whatever has occurred in nature will occur again, under the same influence, and present the same phenomena, so is it proper, in an inquiry into causes, not to draw inferences from the enumeration of particulars, but to deduce universal principles from the observations of particular experimental, or even accidental observations. Thus, as you will see, Lord Bacon threw out altogether the enumeration principle and moved into the particular. But the induction of Bacon went even further; it taught that, instead of collecting so many causes and selecting one as the most prominent and therefore the real cause, it were more correct to consider whether each cause might not, with greater truth, be weeded out of the argument, rather than wedded to it. Thus he separated nature by proper rejections and exclusions; and by such exclusion or clearing away of impossibles, he proposed to arrive at last at that cause which, in the absence of all other causes, was sufficient to account for all the facts connected with the phenomena under consideration.

I hope I have made this clear; because I wish to impress on you the fact that the Baconian system of induction is the one which you must follow, if you would do any thing solid in the process of medical discovery. You must not say in regard to any phenomenon, whether physiological, pathological, or symptomatical, "Lo! this is the cause, or that is the cause," inasmuch as such or such an apparent cause is present; but you must accept even the cause most probable as *problematical*, until

you have proved that as a cause it does not admit of exclusion, and that all other apparent causes do admit of exclusion as apart from, and unnecessary to the development of the phenomena before you.

If you have understood these observations, and if you will follow them out in your future career, you will save yourselves from one of the most natural and fatal errors common to men who loosely follow scientific pursuits. You will not, when you see the working of any natural law, say at once, "There is the reason of this law"; you will not endeavour to pick out reasons for the law and apply these hypothetically to explain the law; for this any stupid or cunning deviser can do. But you will look at the facts as phenomena before you; from the study of these you will descend to the discovery of the one cause of the phenomena, and you will look only for one cause, as knowing that there cannot in nature be two causes for one effect. In the modern revolution of medicine the change from the general to the particular mode of induction is a leading feature; and you must consequently learn and work by the Baconian or exclusive method, or your labours will be as puerile as they will be diffusive.

In olden times, the study and practice of medicine was based on the mere observation of diseases themselves: and he was thought the greatest man who could split up symptoms into diseases *per se*, in the most elaborate and verbal manner. Hence the origin of such a flux of nonsense as Cullen's Nosology. In present times, this refinement of division is cast off, and men are advancing by true induction, back from symptoms to causes, and to *few* causes. They are beginning to talk about the elements of disease, and to limit these elements to the smallest possible number. They are beginning to connect disease-symptoms with certain natural functions, and to observe that symptoms are but exaggerations or depressions of natural acts. They are going further—they are aiming at the discovery of natural functions, and are foreseeing that when the natural act is understood, its aberrations will also be understood as a necessary sequence.

You true pilgrims must also follow this progressive course,—follow it rigidly and persistently.

In olden time, the manifestations or signs of disease were accepted as originating in the body itself. The causes of diseases were internal. Past and once renowned practice-of-physic-books were full of nothing so much as practical proofs that this disease originated in the liver, that in the blood, and so on. There were great schisms, too, in medicine, on the

questions whether diseases in general originated in the solids or in the fluids. Hence arose such terms as humoral pathology and pathology of solids. These absurdities even yet stick to medical language. But the true science of medicine in these days laughs at the old dogma. Now, falling back on Baconian principles, and tracing phenomena towards their essences, and excluding the coincidences, which were once considered essentials, we have traced the causes of diseases out of the body altogether, and have proved that some ninety-nine out of a hundred maladies are from the external world.

How this one grand step has revolutionised medicine; how it has led to the building up of the new and noble fabric of hygienic medicine; how it has erased some diseases altogether; how it has simplified the study of disease; how it has brought the study of medicine into closer communion with chemistry, natural history, natural philosophy, national history; how it will yet influence our destinies as a profession—are points which can only be understood by those who are acquainted with the past history of our science, and who, standing now as prophets with their heads turned backwards, are able to read off from the history of the past the events of the future. And yet for your hands there remains much to be done. The great problem of the external cause of disease has to be resolved into its ultimates. Special causes of special diseases have yet to be hunted down. Where burrow the poisons of scarlet fever, of small-pox, of typhus? They are out in the universe. Do you isolate but one of them, and show its annihilation, and your pilgrimage is immortal.

In olden times, the treatment of diseases was based on the hypothesis of the internal or corporeal origin of the disease itself. The disease was located in the solids; therefore the solids must be strengthened or resolved. The disease was located in the fluids; therefore must the fluids be attenuated or condensed. Thus the idea of externals in the treatment of disease was excused altogether, and treatment was made up of one grand hypothetical system of modifying the condition of the body, or parts of the body, by medicaments, blood-lettings, scarifications, and the like. A great abuse thus crept into medicine; and such unquestionable evil resulted, that the acute observer Addison was led to utter the satire, "that doctors were divided into two classes,—those who slew in chariots, and those who slew on foot." The satire was overstrained, yet not wholly devoid of truth. Men locked up with fever in the foul atmospheres of jails, were left in such foul atmospheres, and were bled, purged, and blistered, to be—shall I say it?—*cured*. And errors of this kind, while

almost universal, were the more glaring, because the very attempts at "cure" were based on the ignorance of empiricism.

In these days, the fact of the external origin of diseases has led some men into the opposite extreme, and the treatment of disease is left to the application of external means. Pure air is now the remedy for the typhus stricken, for the consumptive, and various other sufferers; and the natural process of cure is talked of as *the* cure, and the only cure. With regard to this modern phase in medicine, I would advise you cautiously, and by the laws of common sense. I would inform you that there are many diseases which, having a purely external origin, are removable by the withdrawal of their efficient cause, and are not removable by any narrower or less philosophical process. I would tell you, too, that many diseases which spring from the action of a poison taken into the body, get well by a kind of natural process, from the circumstance that the poison, being taken in as though it were a food, is modified as it passes through the animal laboratory, and being thrown out of the body by the excretions, is so lost that the removal of the symptoms, which were dependent on the presence of the poison, is ensured. I tell you this boldly; but I would not tell you that such natural elimination of the poison is a certain preservative from death, and that there is, therefore, an absolute *vis medicatrix naturæ*, or curative entity inherent in man. Not at all; for were this the case, all patients would naturally get well, which is not the fact. The truth lies in this,—that while in the natural or spontaneous elimination of the exciting causes of disease, cure is, in many cases, promoted, in other cases the very act of elimination leads to the setting up of such new and important physiological modifications that death is the result.

I leave it, therefore, on your minds, that you have three things to learn in the treatment of disease according to our modern knowledge: *first*, how to remove external causes; *secondly*, how far to trust to the spontaneous evolution or removal of causes which have taken effect on the body; and *thirdly*, how to meet those extreme results which sometimes succeed the natural or spontaneous attempts at removal.

In olden times, the science and art of surgery was a rude, and even cruel practice. "Spare not," was the surgeon's pass-word; and brilliancy with the knife was as sure a guide to worldly fame, as skilfulness with the sword. The surgeon not only supplemented nature, but dubbed her quack, and took her business from her ruthlessly. Wounds to be "cured" were filled with unguents. Limbs deformed were put

out of sight three fathoms deep, or into sight in the dissector's museum.

In the modern revolution these brilliant exploits are no more. The sound flesh is simply left in natural apposition. The deformity is removed, while the limb still supports its owner; and Nature, instead of being snubbed, is permitted to stand on the card of all intelligent Sawbones as the senior partner in their concern.

You must not be behind in this progress; you must take your partner likewise, and give the lead.

The last series of these instructions brings before you the philosophical study of the action of medicines,—and here you have a great deal to learn; for, while you have not only to ascertain the action of medicaments on the body, you have to isolate the results produced by medicaments from those which would follow naturally, were no medicaments used at all. Here, indeed, is a pivot on which much important matter turns. Go into the actual practice of medicine, and you will see what I mean. Did you ever meet with a practitioner who did not consider himself the most successful of all practitioners? Did you ever meet with two practitioners who practised strictly alike? If, then, all are successful after a fashion—and I believe in this respect we are each of us much of a muchness; and if the line of practice pursued by each of us is not of an equality—*ergo*, our success is dependent on something more than our special modes of treatment; it is dependent on external or internal natural results, which we universally do not see or comprehend.

With you, the first-day Pilgrims in the narrow path of medicine, it rests to clear up these difficulties and differences, to distinguish the natural from the artificial means of cure, to unite the natural and the artificial means of cure; to prove how diseases may be prevented wholesale, and to look upon this as a part of your professional duty; to prove also how diseases, when they occur by accident, are removable in detail, and to feel that neither the one nor the other of these offices is the least, or the greatest.

To sum up all these points of instruction, two sentences suffice.

Work from nature; she is your only authority.

Work by induction; that is your only charter.

If on the mind of but one student here to-day I could imprint these simple lessons, I know not what benefit I may have bestowed on him, on his profession, on the world. All the good things which lie in store for medicine, are, indeed, embodied in the progress of medical philosophy.

You young men, going forth into medical life, ignore not, mistake not, where the citadel of your strength is founded. Be led away by no professional bigotry, by no professional intolerance. When you dictate, think how you can prove. When you blame the world for not recognising the full measure of your services, think how you can convince the world that your services are worth what you presume. When you abuse the quack for his impudence and shallow conceit, call to mind that the quack flourishes on your weakness. Recall the truth, that in astronomy there are no quacks; that in mathematics there are no quacks; that even in simple mechanics, even amongst the artisans who will one day form the lower strata of your patients, there are no quacks. And why? Because the men of these occupations, great or little, work to a demonstration, and are paid or penaltied according to their competency.

Pilgrims of this day, entering on your work, braving all difficulties, to you is left the positive demonstration of medical science: nothing less; nothing more. I would warn you from all by-paths,—political, servile, selfish,—that you may toil on in the narrow way. Colleges may dispense to you legal rights, and universities honours; but on these have no reliance, if such reliance interfere for a moment with your own self-trust. *You are the medicine, not the colleges.* Parliament *cannot* reform your profession, if you reform not your science. Parliament *need* not reform your charters of privilege, if you reform your charters of knowledge. What, if your success come not with the night? It will come with the morning; and will descend on you, not as a mere temporary success resting on thirty-six clauses of act of Parliament, and adapted to a few years of an ever-changing history, but on the permanency of truth and the solidity of nature. Work on in your difficult road, thinking not of the hour in which you live, but of the epoch which you were born to signalize. Work as for a scientific future even in this world. Work in this earnest and unimpassioned spirit; and that future may be so far secured that medical pilgrims, taking their first day's journey in years long to come, shall treasure up your existences with theirs. To this, the fullest reward of your pilgrimage, I direct your feet to-day; and, as you love yourselves, your profession, and your country, strive after it.

> "'Tis of more worth than kingdoms, far more precious
> Than all the crimson treasures of life's fountain:
> Oh! let it not elude your grasp; but, like
> The good old patriarch upon record,
> Hold the fleet angel fast, until he bless you."

NOTES OF CASES OF HYDROPHOBIA;

WHICH OCCURRED FROM TIME TO TIME IN THE SOUTH OF IRELAND, PARTICULARLY IN THE CITY AND COUNTY OF CORK; WITH INCIDENTAL REMARKS.

By WILLIAM PICKELLS, A.B., M.D., Cork.

HAVING, in former numbers of the SANITARY REVIEW AND JOURNAL OF PUBLIC HEALTH, contributed "Notes on certain Vegetable Poisons," I propose, in the present paper, to communicate notes of cases of that dire disease Hydrophobia, the result of a poison conveyed by the bite of rabid animals. My attention was first drawn to the subject by having witnessed in this city, several years since, three cases,—one from the bite of a cat, two from the bites of dogs. At the present moment, when the attention of the legislature is directed to the framing of a law, which shall more effectually restrict the circulation of poisons taken from the vegetable and mineral kingdoms, I have thought that the publication of the notes might be useful, by tending to show the necessity of more stringent legislation than that which now exists, in checking the diffusion of a poison productive of a disease which, in the opinion of the celebrated Meade, is "the greatest calamity to which mankind is liable."

The disease is commonly propagated by the dog; this animal appearing to be more susceptible of rabies than any other. In this point of view, the multitude of useless dogs that infest our highroads, and the streets and lanes of towns, is a great and alarming evil; these animals, when in a rabid state, not only biting passengers that come in their way in the public thoroughfares, but, in some instances, entering at the open doors of dwellings and biting one or more of the inmates. Nor is the evil limited to the loss of human life. Wandering in a rabid state through the country, they frequently bite, not only human beings, but cattle and other animals, valuable as property,—a consideration which should have peculiar weight in the circumstances of this island, now destined, it would seem, in the course of events to become almost wholly a cattle-feeding or pasture country. In almost all the cases of hydrophobia from the bites of dogs, which will be given in this paper, the bite was inflicted by a dog of this description.

Some medical writers have asserted that the disease, when derived from the cat, is not genuine hydrophobia, but a modified form, comparatively mild in its symptoms. Good, in his Nosology, has created two new species: 1, *rabies felina*, with

little spasm; 2, *rabies canina*, with much spasm. He has omitted in his definition of feline rabies the fear of water,—the reason that induced him having been, according to the author of the article "Hydrophobia" in the *Cyclopædia of Practical Medicine*, the simple fact, that "the cases on record from cats are too few to afford a firm basis for any inference." The cases from the bites of cats, which will be given in this paper, go fully to prove that the disease, when thus communicated, is genuine, unmitigated hydrophobia. Marochetti, Christison, and Colles, are of opinion that the bite of the cat is more dangerous, as more certainly communicating the disease, than the bite of the dog. The statement of the mode in which, in some cases, the disease was contracted, owing to rashness on the part of the unfortunate sufferer, in exposing himself to the chance of being bitten, may operate as a caution to many against incurring, by like rashness, a similar fate.

In general, the disease has been communicated by strange or stray dogs or cats. In not a few instances, however, the bite has been inflicted by a house-dog or house-cat: in some instances the owner has been bitten, while unwarily fondling or playing with a favourite dog or cat; an animal fed from his table, petted, perhaps, like the lamb of Nathan in Scripture, "eating of his bread, drinking of his cup, sleeping in his bosom", becoming thus, in an unsuspecting moment, his assassin!

A few writers there have been who, setting at nought the accumulated testimony of so many ages, and of so many various nations, have denied the existence of hydrophobia as a real specific disease, regarding it as, in every instance, "the result of fear,"—a thing of the "imagination"—a metaphysical abstraction, existing, according to one, "only in the brains of a few speculative writers;" according to another, "a fable for the historian, and a metaphor for the poet." A fair appreciation of the facts of several of the cases, which will be brought forward in this paper, might, if other evidence were wanting, be alone sufficient to show the fallacy of so dangerous and Quixotic a notion.

I was particular in noting instances from the bites of cats; the cases on record from this cause being, it appears, so few.

The sufferer in the case from the bite of a cat which I witnessed in this city, and with the details of which I shall commence, was a fine robust boy, of the name of Lynch, fifteen years of age, son to a poor inhabitant of the North Parish. Seeing, at an early hour in the morning, in the month of April

1830, a cat run across one of the quays of this city, and enter a hole in a waste house, he pursued in order to catch it for the use of his family; but upon putting his hand into the hole for the purpose, he was instantly bitten in the back of the fingers. The animal continued to adhere to the fingers, though the boy withdrew his hand, until repeatedly dashed against the ground. After this, the cat disappeared among the ruins of the waste house, and was no more heard of. The fingers continued to bleed freely during the rest of the day; but, as they healed in the course of some days, without any application, the occurrence passed unheeded. In about six weeks afterwards, on a Monday, the bitten hand, after fatigue in playing ball, became swollen so that he could not close nor lift it; he had also pain extending along the corresponding arm to the throat,—"along the veins of the arm," was the expression used by himself and his family, to mark the direction of the pain. There was no tumour under the axilla. On Wednesday morning following, the symptom of dread of liquids developed itself. There was no application, however, for medical assistance until Saturday evening following,—that is, until the evening before the day of his death, neither himself nor his family suspecting for an instant the real nature of his complaint. I saw him on that evening, at the house of the late Dr. John Barry, of this city, to whom he had made applition as for a common sore throat, accompanied with inability of swallowing. Upon examination, however, of the uvula and fauces, no inflammation was observable. This circumstance, coupled with the boy's statement of inability of swallowing liquids, at once roused suspicion, and led to the eliciting of the facts which I have here stated. He did not lay the slightest stress on the circumstance of the bite, which was compared by himself and his family to scratches of a pin, nor would he have mentioned it had he not been asked, having almost forgotten the occurrence. Scratches were still evident on his fingers. He had walked from his father's house, a distance of nearly a mile, to Dr. Barry's, and had been sitting half an hour there when I saw him; he was very communicative, I might say voluble, in conversation; professing his readiness to submit to any mode of treatment recommended. I had never seen a case of the disease before, and my curiosity was the more awakened, as I was aware, at the time, that some medical writers had denied the communicability of true hydrophobia from the bite of a cat. On being questioned, he said that since Monday morning he had not swallowed a drop of drink, nor tasted a morsel of food; adding, that he would give the world to be able to take a

drink of water, but that he "had a dread of it, that it stopped in his throat." What struck me most, was the excessive nervous agitation of his whole manner, indicative of the utmost misery and horror. Next to this, what appeared most remarkable was the very peculiar expression of the eye, denoting something indescribably scared and haggard. The pencil of an artist might have portrayed it, but words could not have described it. In tone of voice and conversation, however, he appeared bold and undaunted, not entertaining, seemingly, the slightest consciousness of the nearness of death. He complained greatly of oppression of the præcordia, or, as he expressed it, "a drag about the heart"—the heart, as I found, on pressing my hand, palpitating violently (thumping, as it were) against the pleura. His shoulders were much elevated in the effort of respiration. This symptom, however, he attributed to a play-fellow having, some weeks before, raised him from the ground, and held his hand to his mouth until he almost suffocated him. There was no headache, no quickness or other irregularity of pulse. The tongue was slightly furred; the bowels were costive. There was no derangement of the urinary secretion, which was passed freely without pain. Convulsive paroxysms followed, upon his being presented, first with a glass of milk and afterwards with a glass of wine. I can never forget the peculiar oblique look, and suspicious scowl, with which he eyed the liquid as it was brought near, until, at the moment when it came directly opposite to him, he started, as it were, with horror, averting his head, crying, "Oh! oh!" his throat swelling at the same time with spasm. There was no spitting as yet; none of the sublingual glands, described by Marochetti and others, was observable upon examination. The sensibility to cold air, or a current of air, was such that "the draught of a person passing by" affected him. He was quite unaffected, however, by the light of a large window, to which he continued to sit opposite for nearly an hour. While sitting at Dr. Barry's, a member of the doctor's family remarked that the sight of the big drops, which sometimes trickled from his perspiration, brought on the spasms. He was conveyed home in a car, covered, at his own request, with a woman's cloak, though the evening was mild. I saw him on the following morning, in company with Dr. Barry, at his father's house. He had passed a sleepless night. An enema of four ounces of turpentine, which we had ordered, brought off two stools. A warm bath, which we had also ordered, afforded him, he said, some relief. No convulsions took place during immersion in the bath, nor during the administration of the enema. He had sucked,

before our visit, about half pint of water through a wheaten straw, and had also eaten or sucked part of the pulp of an orange. His pulse was now evidently become weak. There was some spitting, and occasional vomiting of white frothy mucus. He continued to complain greatly of want of breath and air. The cheeks were flushed, the face and neck drenched in perspiration. His hair, it was observed, stood erect (*horripilatio*). Upon visiting him two hours afterwards, I found his position in bed had been reversed, at his own request, to avoid, as he said, though the day was very mild, the air from an opposite hole in the wall, which served for a window. He had raved for a moment or so in the interval since the former visit, having fancied that an apron, which hung in the room, was a black cat, and, under this delusion, causing it to be removed. The spitting had now become constant, and the vomiting of frothy mucus very frequent. He consented, to oblige me as he said, to repeat the attempt of sucking in water through a straw, trying for the purpose different straws, until he hit on one of such length as, with the extremity dipped in the vessel, not to require him, while sucking by it, to bend the neck. During the trial of these different straws he caused the vessel to be placed on one side, not directly opposite to him, so as to avoid the sight of the liquid,—refusing, however, to allow his eyes to be bandaged, lest it might "confine his breath." In this way I saw him suck in laterally, his eyes steadily averted from sight of the liquid, about a noggin of water, stopping short at intervals to take breath. His face and neck continued to stream with perspiration. Vinegar has been extolled by some as a specific in the disease. He attempted to suck in a little weak vinegar; but, after swallowing a few drops, was immediately forced to desist, crying out that "it burned him within." On the evening before, while at Dr. Barry's, he could bear to look, though not without repugnance, upon a mirror which was presented to him; but upon a fragment of one being now presented, he turned from it with aversion. He died tranquilly in two hours afterwards, without convulsions or hiccup, manifesting no inclination to bite or spit at any of those present. Some minutes before death, he called for the family prayer-book, and read, or seemed to read, a portion of the contents. Though, during the last hours of his existence, labouring under a state bordering on delirium, with the exception of the delusion of fancying that an apron which hung in the room was a black cat, he shewed no symptom of actual delirium throughout. He lived six days from the commencement of constitutional symptoms, and somewhat more than

four from the development of the symptom of dread of liquids. A *post mortem* examination was not allowed. Upon my calling at half-past 12 on the following day, putrefaction, I learned, had already commenced, particularly in the bitten hand.*

With the case of poor Lynch may be coupled one in which the disease was contracted under like circumstances of rashness. It occurred several years since near Clonakilty, in this county, as communicated to me by Dr. Callinan, of this city, who witnessed it, and was at the time a resident of the place. A peasant, seeing a strange cat on the road side, at some distance from his house, as it is always an object with the lower orders to make prize of a stray cat, thought to catch it; but in his making the attempt, it bit him in the hand, adhering so firmly, that he found considerable difficulty in extricating the hand. The cat was killed rabid. He was a foolhardy sort of fellow, and thought no more of the accident; people in general, as Dr. Callinan justly remarked to me, being little aware that the bite of a cat may occasion the disease. In about six weeks afterwards, characteristic symptoms were developed, preceded by the return of inflammation and swelling in the bitten part. The wound did not heal; a scab remained on it. Around the bitten spot was a dark areola. He died horribly delirious. The sensibility to atmospheric exposure was felt as a severe aggravation of his sufferings; a current of air which blew on his bed-place from a hole in the opposite wall of the cabin, which served for a window, agonising him exceedingly. There was much enlargement (tumefaction) of the region of the stomach, as from flatulence.

About twenty years before the occurrence of the case of Lynch, occurred the case of the servant of a principal merchant of this city, Mr. Goold; the man was bitten by a strange cat, which he struck with a napkin while returning after carrying in the dishes to table. The case excited at the time great interest, and was seen by a number of physicians. Dr. Barry, who was one of the attending physicians, informed me that the nervous sensibility was such, that when he passed between the patient and the light of the window, the man would start up out of bed involuntarily as if to seize him, but would lie down again immediately and apologise. The noise of water poured from one vessel to another brought on the spasms. There

* Happening, shortly after the occurrence of the case of Lynch, to attend professionally in the family of a principal baker of the city, on mentioning to him the facts of the case, he told me he never made use of a cat, as he found an *owl* more efficient in keeping the bakehouse clear of mice. An owl is said to be worth six cats in keeping a barn clear of mice.

was great spitting, and, towards the end, incessant plucking of the bed-clothes as in the last stage of malignant typhus.*

Some years afterwards occurred the case of a Mr. Cronin, who, travelling to town from Mallow, in this county, went into a waste house on the road side, when, just as he entered, a cat sprang across and bit him in the foot. In about six or seven weeks afterwards he was seized with symptoms of hydrophobia, and died, as I learned from his medical attendant, in forty-eight hours, in convulsions. The sight of a mirror alarmed him.

In each of the cases now given, the bite was inflicted by a strange or stray cat. In each of five other cases, all those of females, and which occurred in this city, the bite was inflicted by the house cat.

In the instance of Miss Tisdall, a child eight or ten years of age, which occurred many years since, the animal, I was informed by a near relative, had, the evening before, devoured its young. It had found access, somehow in the morning, to the child's bed-room before she rose, and had hidden itself under the bed. Upon her stepping out of bed, the animal sprang at her from under the bed and bit her in the thigh. She lived about a week from the commencement of the sickness. After inflicting the bite, the cat allowed itself to be brought down stairs, and without attempting to bite any one else, was hanged.

Some years before or after, occurred the case of Miss Gray, who was bitten while turning a cat out of her room previously to retiring to rest.

In another instance, Miss Bennett, an elderly lady, while playing with a favourite cat, was bitten by it in the throat. Hydrophobia developed itself, according to my informant, in three weeks afterwards. It is certain, that this lady was suffocated at her residence, in this city, between beds.

In another instance, which was seen by Dr. Baldwin (sometime representative in Parliament for this city), a Mrs. Crowley, after having the cat in her lap, put it down. The animal wanted to get up again. She struck it. The cat flew at her, scratched and tore her face, and bit her in the leg, adhering with such tenacity to the part, that the servant who came to her assistance, could detach it only by cutting its

* The quickness of ear of hydrophobous patients, in the perception of sound associated with the idea of water, was curiously illustrated in the case of a boy, as mentioned to me by the attending physician, which occurred several years since near this city. Not only the noise of empty tin vessels, though in another room, brought on the spasms, but even the noise of a horse drinking at a stream, which crossed the road at some distance, though no one else in the room could perceive the noise, and though he sat upright in bed!

throat. In six or eight weeks symptoms of uneasiness came on. She was so delirious that it was necessary to tie her to the bed. She also was, I learned, suffocated between beds, a practice formerly permitted from a mistaken motive of humanity, to put an end to the patient's sufferings; ("the patient," as observed by Boerhaave, "dying soon enough without accelerating his fate"); but which has been now expressly prohibited by law in most countries of Europe.

About the same time, a case occurred in the Munster Hotel of this city, as mentioned to me by the attending physician, of a chambermaid, who died of hydrophobia from the bite of the house cat.

Since the case of Lynch, in 1830, no case of hydrophobia from the bite of a cat has occurred in this city. Several have occurred within the period from the bites of dogs, and one from the bite of a fox.

In this county, in the town of Macroom, occurred in February last, 1857, the case of a Mrs. Shea, the wife of a baker in the town, mother of a large young family, "who," according to the report of the attending physician, "was employed in her shop on or about the previous September, when a young cat ran in from the house of a neighbour. She endeavoured to drive it out, but it took refuge behind the counter, and, fearing that it might jump through the window, she pursued and caught it, and when in the act of putting it out of the door, it turned on her and inflicted a severe bite on the little finger of the right hand. She at the time expressed some uneasiness at the occurrence, but soon forgot it, and continued to enjoy her usual good health until the 4th of February, when she complained of pain running up her right arm. She died on the morning of the 8th. Chloroform administered, so far from relieving, increased the convulsive suffocation to such a degree, that she declared it would cause her instant death if not removed. She would not permit the bottle to remain in the room."

In the workhouse of Mallow, in this county, about a year and a half since, occurred the case of a child who, it would appear, was not bitten, but only scratched by a rabid cat. The scratch of the claw of a rabid cat has, it is stated, communicated hydrophobia to the human subject. A coroner's inquest held on the child returned a verdict that she died of hydrophobia.*

In the autumn of 1843, a case occurred in Tralee, county

* The spur of the ornithorynchus paradoxicus is, according to Blumenbach, the only instance of any part of an animal in health being capable of conveying hydrophobia.

of Kerry, of the death of a grown boy from the bite of a cat. The cat had strayed from the house; the boy pursued it and seized it, when it bit him.

Braugmarten, a German physician, who has written on hydrophobia, says, "Before the dread of water sets in, the cure is not only practicable, but not unfrequent." He seems to have echoed the words of Avicenna, who says in a remarkable passage, speaking of hydrophobia:—"Cura propinqua est ante terrorem aquæ." If stress can be laid on a passage, the terms of which are so vague and ambiguous, it must mean the interval between the commencement of constitutional symptoms, and that of the dread of liquids; for, previously to the appearance of constitutional symptoms, there is nothing to indicate that the disease will take place. An early indication of the virus having become active, or of the constitutional action having commenced, is not infrequently afforded by the reappearance of inflammation or pain, as in the cases of Lynch and of the boy near Clonakilty; or by numbness or prickling sensation (as in a case which will be subsequently given), in the bitten part; analogous to the effects of other diseases which can be communicated by inoculation, it appearing to be a law of such to excite inflammation, or recrudescence, at the place of insertion, shortly before they shew themselves in the constitution. I find it stated too, by some eminent recent authorities, that if any good can be done, it is in this stage; in the second stage, that is, when the dread of liquids has set in, all means hitherto used having proved unavailing. In Lynch's case, the interval lasted two days, that is from Monday till Wednesday morning; but it sometimes exceeds this period. The misfortune, however, is, that no application is made for medical assistance until the disorder has been fully developed, or has passed this stage; it being mistaken, as in the cases of Lynch and of Mr. Cronin, for a common sore throat; or, as in other instances, for a cold or feverish attack, or for rheumatism, or hysterics, or some other affection, masking the real disease. The pain and swelling of the bitten hand were attributed by Lynch and his family to over fatigue in ball play. It may be a question, whether but for the excitement of the ball playing, the virus would have been called into action at all; an observation which suggests the necessity of caution to those who have the misfortune of being bitten by a rabid animal. A medical writer states, that, "in all the cases he had met with, there had been shortly before the setting in of the symptoms, exposure to some considerable excitement."

John Hunter, in an able paper on the disease, in remarking

on the little diminution of muscular strength, in the operation of a poison so destructive to human life, gives two cases, which though they ultimately proved fatal, "were remarkably relieved by running." The relief thus obtained could not, however, as may be inferred, have been owing to the perspiration excited; a supposition, to which what we are told of the effects of dancing in curing the disease occasioned by the bite of the tarantula, might seem to lend a degree of plausibility, as numerous cases have been attended, as in the case of Lynch, with copious and long-continued perspiration without relief having been obtained.*

Of the two cases of hydrophobia seen by me, in each of which the bite was inflicted by a dog, one was that of a female, the other that of a male. The female, a young woman of about eighteen, had been bitten four months before by a *cur dog*, belonging to an inmate of same house, the house being tenanted by poor room-keepers. The case was seen also by Sir James Pitcairn, late Deputy Inspector-General of Hospitals for Ireland, who resided at the time in this city. The case occurred in 1832. I saw her on a Thursday, about one o'clock, p.m. Symptoms commenced with pain and sense of suffocation in throat, but she did not take to her bed until Tuesday night. She had been hot and feverish for a couple of days before. She could not swallow any drink—(she had eaten, however, two or three strawberries). The moment a vessel touched her lips, spasms came on. When spasms came on, there was increased action of the heart, with occasional, as ascertained by feeling the artery, in-

* M. Buisson, in a small tract addressed to the Paris Academy of Sciences, in 1823, using as an argument from analogy the story of the mode of cure of the bite of the tarantula, recommends as the mode of treatment in hydrophobia, "that the patient should take a certain number of vapour-baths, and should induce every night a violent perspiration, by wrapping himself in flannels, and covering himself with a feather bed." Those who seek to cure hydrophobia by forcing sweats, whether by violent exercise, or by the vapour-bath, or by the hydropathy of the present day, seem not to be at all aware that sweating as a symptom of hydrophobia, had been noticed so far back as the time of Cælius Aurelianus. Lynch's fancying an apron that hung in the room was a black cat, and under this delusion causing it to be removed, might seem to lend a degree of plausibility to the above supposed analogy; persons bitten by the tarantula, according to Baglivi, having a great aversion to black. In one of three cases seen by Dr. Meade, as reported by him in vol. 5 of "Phil. Transactions", abridged, the patient, a boy, "had a strange aversion to anything white, saying that, if all the women in the room who had white aprons would go out, he would be well presently." Meade attributes this to hydrophobous patients so ill bearing the light, that the sight of anything white is intolerable. In Lynch's case, however, there was no intolerance of light. Truth is, that though all, with very few exceptions, agree in the main symptoms of dread of liquids, and dread of air (hydrophobia and aerophobia), the difference in minor points, in different subjects, is such, that in this respect hydrophobia, as has been said of typhus fever, may be said to be a Protean malady.

termissions of pulse. When the spasms went off, the pulse became regular again, with a rate of about 130. Dread of cold air was very distressing. She cried out that some person in the room had a cold breath. There was intolerance of light. When a looking-glass was presented, she could bear to look at it, but said her eyes, which were naturally full and prominent looked "like moons." Previous to the present attack, she was described as being remarkably beautiful, and of rather a full habit; her features were now sunken and ghastly. Towards the end there was great discharge of saliva. There was no actual delirium, but, as Dr. Pitcairn expressed it, "she seemed every moment ready to fall over into the sea of delirium." She cried out "to be tied." She died on the same night at ten o'clock; that is, in five days from the commencement of constitutional symptoms. She was bitten in two places, in the fleshy part of the right leg. She complained of pain extending from the bitten part down her leg; the ankle of the bitten extremity was blue. Turpentine enemata were the curative means tried. The dog, after biting another inmate of the same house, was hanged.

Thomas Keeffe, aged 17, of robust frame, living in Hardwicke Street, was seen by me on Tuseday, August 12th, 1834. His father was holding him when I went into the dark narrow back ground-floor room, in which he lay. He cried out to me, "they were restraining him," calling them murderers. He thought the bite of "that dog" did not signify. He had been bitten about three weeks before by a strange cur-dog, which came into the room from the street, and to the tail of which he attempted to tie a canister; it being a mischievous trick of boys to tie a canister to a dog's tail, and then to send him running a-muck with it through the streets. He was bitten in the thumb of the left hand in three places; the cicatrices were small, though it had been found necessary to detach the dog with a shovel. The wound did not fester, but healed readily, and the thing passed unheeded by himself and family. On the previous Sunday morning, after a sleepless night, feeling himself thirsty, he got out of bed to take a drink from a water-jug, but, on attempting it, "shuddered, and could not touch it." He ate his dinner apparently well on Saturday; the night before, however (Friday), he had also a sleepless night. He walked on Monday morning to Dr. Harvey's house in a neighbouring street. There was great anxiety, Dr. Harvey told me, about him then, but he did not suspect what was the matter. He was struck, however, by his desiring the woman who came with him to cover his mouth with her cloak. Shortly after his return from Dr. Harvey's, he was visited by a clergyman, who,

surprised at something that occurred, while administering the rites of the church, was led to inquire of him whether he had been bitten by a dog. It was thus that the real nature of the disease was discovered, and communicated by the clergyman to his family.

It was about three o'clock, p.m., when I saw him. He had taken some pills, ordered for him by Dr. Harvey, but had not swallowed any liquid since the previous Saturday. He made frequent attempts by "coaxing it sideways to his lips," and with various gesticulations, somewhat in the manner of those affected with St. Vitus's dance, but failed. In the progress of his sickness, the morbid sensibility of surface was such, that even the cold breath of a person who approached him agonised him. As in Lynch's case, urine was passed freely and repeatedly, without pain, or without, as sometimes happened, bringing on the spasms. The discharge of saliva and frothy mucus was very profuse, the floor being all begrimed with it. There was no actual delirium, but the excitement was so great as to border on it. He at one time cried out "to tie him;" was quite aware of the nature of his disease, frequently exclaiming, "I am innocent of that dog," and seemed apprehensive of being smothered, exclaiming, "they are going to murder me," "I am dying," "Let me die." Words of his at intervals to those about him, though wild and incoherent, were painfully affecting. "Father, kiss me, though you are my murderer. Don't kiss me, for fear I may bite you, and you may go mad too: kiss my foot." He called on us individually by name to pray for him, and say, "Lord have mercy on him." His last words were (to his sister), "Hannah, good bye." I forbade his family to kiss him. "Father, they will be yet throwing this in your face"—his having died of the bite of a mad dog. He died tranquilly at half-past six the same evening, on the fifth day from the commencement of constitutional action, and on the fourth from the development of the symptom of dread of liquids. Upon calling on the following day, putrefaction, I found, had commenced, the thumb and palm of the hand being livid, and a black line or streak extending from the thumb up the arm to the acromion. Might this have been an indurated or enlarged lymphatic? Monro (*On Morbid Anatomy of Gullet, Stomach, and Intestines*) says, "Though it is probable the poison of hydrophobia is absorbed, yet the lymphatic vessels, and lymphatic glands have not been observed to be indurated or swelled." The morbid action of the poison is still "a vexed question;" whether it is carried into the circulation by the lymphatics, so as to effect a change, leavening, as it were, the whole mass

of blood; or whether it causes some peculiar effect upon the nerves of the injured part, and through them on the brain and nervous centres.

In both the above cases, there was a remarkable preference of the prone position in bed, apparently with some relief to the respiratory organs, dyspnœa having been in both a prominent and very distressing symptom. In two or three instances in which typhus fever was complicated with asthma, I remarked a like preference of the prone position, as if affording some relief to the respiratory organs. In Keeffe's case, while in this position, there was much jactitation of the lower extremities.

In none of the three cases which I saw, was it found necessary to resort to any extreme measure of coercion. In Keeffe's case I had been strongly urged by his family to allow the application of the strait-waistcoat, but refused, conceiving that in a case so utterly hopeless, in which there was no disposition to injure others, it would have been a measure of unnecessary rigour. Without going the length of saying with one of the medical gentlemen, examined before a committee of the House of Commons, in 1830, on the subject of canine madness, "It is a vulgar error to suppose hydrophobous patients are mad; they are not mad," I believe the madness, or furious delirium, attributed to them has been often the exasperation produced by needlessly harsh treatment.

In the great hospital of Paris, it was formerly the rule to tie every hydrophobous patient indiscriminately to the bed. In Prussia, by an edict of the present king, some years since, among other directions for the treatment of hydrophobia, it was ordained, that every hydrophobous patient should be confined in a strait-waistcoat.*

The following case which occurred in July, 1835, at a place called Feenagh, county of Limerick, as reported by the dispensary physician, the late Dr. Graham, evinces the prodigious augmentation of muscular strength which, when the symptoms *are* maniacal, sometimes takes place in hydrophobia. The sufferer was a lad about twenty years of age, named Garrett Nagle. He "was working on the repairs of a road about three weeks before, and was bitten in the hand by a *small dog*. From that time until the afternoon of the day preceding the night on which he died, no effects were apparent; but now he complained of drowsiness and headache. He left off work and came home,

* In the Prussian dominions, in the ten years ending in 1820, 1666 persons, according to Marochetti, died of hydrophobia.

when his mother prepared some mulled porter for him. At sight of the liquid he shewed some uneasiness, and when it was offered to him to drink, he became delirious, and shortly afterwards raging mad. He was secured and tied to a bed by two policemen (his relatives and friends, as well as all the neighbours, having run away from him), but he broke both the bindings and the bedstead to pieces, and he was, at his own request, during one of the lucid intervals from the violent paroxysms of spasm, handcuffed by the police to prevent his injuring himself and those who were about him. He continued in the most excruciating torments for about sixteen hours, when death released him from his sufferings."

The mention of the police being employed in the above case, brings to mind a case which occurred, several years since, in a barrack, as communicated to me by a friend of mine, an army surgeon, who was quartered at the time with his regiment in the barrack. The dog, a sporting one, of the spaniel breed, had entered the barrack by night and bitten one of the men, who afterwards died of hydrophobia. It had been turned out of an upper room which it had entered, in which were a number of the men. The unfortunate man who perished, having had occasion to go down stairs, was met by the animal on his return, when it flew at him, and bit him in various places before it could be bayoneted. Upon dissection of the dog by my informant, he found in the stomach, besides the usual crude mass of indigestible matter (feathers, straw, &c., which the animal had gobbled up) half of a fowl (a hen), with the feathers on. The stomach was quite dry and contracted, as if the secretion of the gastric juice had been completely at an end. The membrane, he thought, somewhat thinner than natural. There was a red patch or two about the cardiac orifice. On the pia mater was a slight blush of inflammation, but no effusion. There was no inflammation of the trachea or œsophagus. An assistant in the dissection, happening to have a scratch on one of his fingers, being of a nervous temperament, fancied he had inoculated himself with the virus, and was seized with hysterical paroxysms, resembling those of hydrophobia, which lasted two or three days.

Since the case of Keeffe, in 1834, I am aware of five cases from the bites of dogs having occurred in this city, or its immediate vicinity; all those of children so young—from five years of age to eight—as to preclude the idea that the disease had been brought on by fear or mental emotion, arising from knowledge of or sensibility to the peculiar danger incurred from the bite.

In 1837, occurred the case "of a boy, five years old, who died in the South Infirmary of this city, after fifty hours suffering. He had been bitten by a dog five months before," the symptoms having been more tardy in supervening than is usual in young subjects.

After an interval of nearly ten years, there occurred in March, 1847, the case of a girl, eight years old, who was bitten in her own dwelling by a cur dog which leaped from under a table and bit her severely in the face, breaking three teeth of the upper jaw. The symptoms began to manifest themselves four weeks after the occurrence. She lived four days. There was little or no mental aberration. Though disinclination to liquids was marked, there was no actual inability of swallowing them. The most striking symptom was dyspnœa. The wound had been attended to by a surgeon and soon healed, there having been no unhealthy discharge.

In each of three other cases which occurred subsequently, the child was said to have been bitten while at or near the door of its dwelling, by "a small dog"; in one instance a poodle, which ran by, snapping in its way. The last case was in the spring of 1854. Thomas Barry, a child five years old, son to a farmer living near town, was playing with some other children in a haggard, when a large dog, in running by, snapped at and bit him in the nose. The wound was little more than a scratch, and healing readily, gave no alarm; it happening, indeed, not infrequently that when the injury has been very slight, the bite is almost as little regarded as a flea-bite. He continued to go daily, as usual, to a neighbouring school. In about six weeks after, while at school, he was seized with a fit of crying, and was otherwise so troublesome, that the mistress directed an elder child, a sister who went also to the school, to take him home. In doing so, she thought to avail herself of a short way which led across a small stream of water or ford; but on coming to it, at sight of the water, the child recoiled, screaming, and could not be made to pass! It was found necessary to carry him home by another way, so as to avoid the sight of the water, on a man's back. In the course of his sickness, though "dying," as one of the family expressed it to me, "for a drink of water", when brought to him, "he could not look at it, nor touch it." He lived about thirty hours from commencement of the symptoms. He died in great agony. He was quite delirious. He foamed much at the mouth. Under the delusion of an old prejudice, which unfortunately has not yet become quite obsolete even among the better classes, he was said to have barked like a dog. The

dog was shot A dog and calf, which were also bitten by it, died rabid.

In February 1833, occurred a case from the bite of a fox; the bite having been inflicted four months before. The sufferer, a man named Driscol, had risen at an early hour in the morning in order to be in time for his work at Lota, three miles from his place of abode. A little dog he had with him pursued an animal into a sewer on the highroad. Supposing it to be another dog, the man hallooed. The fox bolted, and after running a little way, pursued both by dog and man, turned back and flew at the man, biting him in the tip or lobe of the left ear. He at first repelled the attack; but in the second attempt was bitten. He paid little attention to the accident himself, until the ear was seen bleeding by a young woman going the road. The fox, after biting him, ran back into the sewer, and was coming out again to attack him, but went back. The man lived from Monday till Thursday. On Monday, when my informant, the late Dr. MacNamara, first saw him, he would hold, while conversing with him, a vessel of water a considerable time in his hand, but when he attempted to drink the paroxysm came on. At another time, the bare mention of water brought on the spasms. The morbid sensibility of surface to currents of air, or the impulse of any thing blowing on him, was present to a great degree. He could not bear the sight of a mirror, nor a piece of sheet tin, when presented. He lay quiet. It was not found necessary to restrain him. He retained consciousness to the last. According to his dying request, the sewer was examined, and the skeleton of the fox was found there. It was a pet fox, supposed to have strayed from a neighbouring gentleman's demesne.* Many years since a case occurred in this county of a huntsman, who got hydrophobia from the bite of a fox, in endeavouring to save the fox from the hounds.

Arising almost always from dogs, the spread of hydrophobia in this part of Ireland has been commonly traced to the *cur-dog*. The multitude of dogs of this sort on the high-roads, and in the streets and lanes of towns, has been long complained of—to quote words applied to it—as "a crying and enormous evil." In many of the lanes of this city, scarcely is there a room-keeper, however poor, who does not keep one or more dogs of this sort, to the danger or terror of the passenger in passing through them. The dispensary physician,

* The young fox, by the bite of which, while patting it, the Duke of Richmond lost his life in Canada from hydrophobia, was a pet fox.

in visiting the sick poor at their homes in these lanes, incurs, as he has often complained, considerable risk, these yelping inmates being apt to fly at a stranger. When the owner is expostulated with, and asked how it happens that he who can hardly feed himself, keeps so many dogs, the answer is,—"They cost nothing, sir; they forage for themselves:" that is, they prey on the garbage thrown out from houses by night into the streets, and this failing, take to plunder, snatching a mouthful, when opportunity offers, from some kitchen, or cookshop, or huxter's or butcher's stall.*

In the two cases of hydrophobia from the bites of dogs, which I saw in this city, the bite, as mentioned above, was, in each instance, inflicted by a *cur-dog*. At dates prior to the occurrence of these cases, occurred the case of a poor sweep, who got hydrophobia from the bite of a cur-dog in separating him from another dog, with which he was fighting in the street;† and that of a child, who was overturned and bitten over the eye by a cur-dog, in making his escape from another with which he had been fighting in the street. The disease came on in three weeks after.

The writer of a letter signed a "Friend to Humanity," addressed to the editor of the morning paper of this city, in March, 1848, in communicating the fact of a cur-dog, apparently in a rabid state, having a day or two before run through the most populous streets of the town of Bandon, in this county, and bitten no fewer than ten persons, before he was destroyed by the police, added, as showing the necessity of more stringent legislation, that besides cases of hydrophobia occasionally noticed in print, many others had occurred in the western parts of the county, without having received publicity.

In Limerick city, much about the same time, "a large black dog, in a rabid state," according to a Limerick newspaper, "entered the house of Mr. ——, Thomond Gate, and bit the servant boy, who was in the kitchen, in the thumb and shoulder. The furious animal then ran down Thomond Gate, snapping at every one in his way, and effected his escape without being destroyed." Two of the individuals bitten died some time after of hydrophobia. In Limerick city, some years

* "He that has not bread to spare, must not keep a dog", is a Spanish proverb: "A quién no le sóbra el pan no crie can."

† In Durham, in England, some years since, a Mr. —— died of hydrophobia, caused by the bite of a dog, which he endeavoured to separate from another, with which it had been fighting under a table. So true it is that, "He who parts a fray, gets the worst of it."

since, as stated in the newspapers at the time, "One of the city police having discovered a pig, quite in a rabid state, in one of the streets, shot it, and had the body thrown into the Shannon. In the course of the evening some wretches attempted to take it out of the river, in order to expose it for sale. The police having been informed of this movement, had the body taken up and burnt." There can be little doubt that the flesh of animals which have died rabid is often sold in the market. It is a moot question, whether the flesh of animals, which have died rabid, is not, when eaten, capable of communicating hydrophobia to the human subject.*

In country districts, the multiplication of cur-dogs appears to have been a still greater nuisance than in towns. The traveller could pass scarcely a farm-house or cottage, however poor, without being annoyed and worried by one of these inmates rushing out. They were snappish, and to be found at the heels of every horse; by alarming with their noise, and sometimes seizing the animal by the heels, causing him, in not a few instances, to run away with his rider. Parties of idle fellows might be seen, particularly on Sundays, accompanied by troops of these dogs, and of terriers, roving through the country in search of game, or for the purpose of baiting cats, though "a baited cat has sometimes turned a man into a mouse, becoming fierce as a lion." In one of the volumes of Martin Doyle's *Quarterly Journal of Agriculture*, published some years since in Wexford, is "A Chapter," so entitled, "on Cur-dogs." After a rough calculation or census of the comparative numbers of other dogs, the writer observes: "We have 10,000 dogs left, which I shall beg leave to call useless, troublesome, and food-consuming curs. On my entering the cabin of a poor widow and her family, living on a meal a day, a dog lay cowering near the hearth. Of course he flew at me on my entrance. Why, said I, do you keep this brute as sentry, when you have not as much food as would give supper to a mouse? The widow assured me, in reply, that the cur was not an expensive inmate, that 'he was a good warrant to shift for himself, and that she never gave him a bit to eat;' in other words, that the poor brute was left to prowl about the country in search of a mouthful of carrion, which he may

* Nothwithstanding our civic authorities' fulminations against unmuzzled or unlogged dogs, and our canicidal campaigns in the dog-days, as if hydrophobia and canine madness were not of all seasons, to how many cities and towns may not, at the present day, the line of Horace in reference to the streets of ancient Rome apply:—

"Hâc rabiosa fugit canis, hâc lutulenta ruit sus!"

get in two months, he being otherwise led into the temptation of taking a lamb or sheep from a neighbouring field, or of preying upon a farmer's fowl yard. Many a horse," the writer adds, "has, in this country, started and kicked, and run away with his rider, and flung him to the ground and killed him, in consequence of the sudden rushing out of a cur-dog at his heels; and many a man has been deprived of life in the most horrific manner by the bite of his own dog!"

At Kilrush, County Clare, occurred a case of hydrophobia in March of 1844, which, from the misery and destitution into which were plunged the poor family in which it happened, excited at the time much and general interest. A boy, named Walsh, was bitten in February by a young dog which he had been rearing. No notice was taken of it till, in about four weeks after, the disease manifested itself in all intensity. What made the occurrence more melancholy was, that five others of the family, including the father, had been also bitten. The family were described as renting, at a pound per year, a quarter acre of land, on which they lived in a hovel, situated on the brink of a frightful sand-pit. Potatoes and salt, and occasionally a salted herring, had been their usual food. A horse, their sole means of support, which had been also bitten, died rabid. They could get no employment; they were deserted even by their relatives. Their neighbours were all afraid to approach them. The only person in communication with them was the dispensary physician of the district. These particulars, published in the newspapers, appeared to excite general commiseration. As at this time (1844) there was a marked increase of cases of hydrophobia in England, and in the north and south of Ireland, the daily press teemed with nostrums and prophylactics of all sorts, under the title of specifics; each was vouched for as infallible, with the same confidence as has been vouched for, of late years, the infallibility of each of certain specifics for Asiatic cholera; all who took it were saved,—all who did not take it, died. With others sent from different places to the family at Kilrush, one, which had been brought from Bohemia by Lord Clanwilliam, was sent from England, together with another specific—the best of all—the liberal donation of £20 by Lord Arundel, the present Duke of Norfolk.

In December 1846, according to the Limerick paper, "a fine boy, seven years old, son of Captain Kennedy, agent to the Devon estate, died of hydrophobia at Newcastle, near that city, from the bite of a stray cur-dog five weeks before."

In Castle Island, county of Kerry, in June 1844, "a poor woman died of hydrophobia, after three successive days of agonizing suffering, who had been bitten in the upper part of the wrist in May by a stray cur-dog, while driving some geese convenient to her house."

In Dungarvan, county of Waterford, "a poor woman, named Connor, died of hydrophobia in December 1844, from the bite of a small dog, which bit her several weeks before."

In the case of Garrett Nagle, who was bitten while at work on the repairs of a road, the bite, as mentioned above, was also inflicted by a small dog. The small dog, and the stray dog, may, in almost every instance, be taken to mean a cur-dog.* A peasant, returning home from a wedding party late at night, was bitten on the highroad by a stray dog, and died of hydrophobia. A boy, herding some sheep of his father's, was bitten in the hand by a stray dog, while in the act of defending the sheep from the dog, and died of hydrophobia. A poor girl, milking a cow in a field, the cow having been first bitten, was bitten by a stray dog, and died of hydrophobia. It is usual with dogs, in the commencement of rabies, to stray from home, biting frequently in their wanderings human beings and other animals. The loss to farmers and graziers in the destruction of "stock" by the bite of rabid dogs wandering through the country has been often grievous, if not ruinous. We may readily infer this from the accounts which occasionally appear in the public prints, of the ravages of a single mad dog among a flock or a herd. In the loss of his pig, or—as in the instance at Kilrush—of his horse, or as in other instances of his poultry, from the bite of a rabid dog, the poor cottier has, in Ireland, sometimes lost his all!

The following case may be interesting, as exemplifying the fact of the extreme shortness of interval (in this case only a very few days), which has sometimes elapsed between the infliction of the bite and the setting in of symptoms, contrasting widely with those instances recorded, in which the symptoms did not take place until twelve months or upwards after the bite. In the case of a peasant, which occurred several years since near Fermoy in this county, attended by the late Sir George Alley, physician to the Fermoy Dispensary, the symptoms, as I was informed by the resident medical officer of the Dispensary, did not manifest themselves until two years after

* Sir Walter Scott, in "Waverly", has given a graphic account of the nuisance of "innumerable cur-dogs" on the high roads of Scotland, at the time in which the scene of "Waverly" is laid.

the bite. In the present instance, a poor girl, washing clothes at "a slip" on the side of the river Bandon, was bitten by a stray hound belonging to a gentleman in the neighbourhood, which swam across the river from the opposite side, and landing at the spot where she was, bit her in the cheek. The disease, terminating fatally, came *on in three or four days after the bite.* She died in convulsions. The late Rev. T. R. England, who was my informant, hearing of her sickness, had some tea made for her; but, upon its being offered to her to drink, he was surprised to hear that she refused it with marks of great aversion,—tea being regarded by the poorest class here, particularly in country places, as a luxury. Seeing a cut or scratch on her cheek, his suspicions were roused, which were the more awake from his having formerly seen a case of the disease, and from having read a good deal on the subject. Thus the fact of her having been bitten in the manner stated was elicited. She was, he said, an ignorant country girl, very young, who had probably never heard of such a disease. "Dread of water" is not a symptom in the rabid dog; the supposition that it is has sometimes led to fatal errors. In the case of the peasant which occurred near Fermoy, the bite was inflicted in the thumb. The first symptom, on the disease manifesting itself, was numbness, and a pricking sensation as "from pins and needles" in and about the thumb. Died in forty-eight hours. Was so furiously delirious that it was necessary to "pinion him behind." The aversion to a smooth shining surface was very marked. A piece of looking-glass, which was stuck in the mud wall of the cabin—opposite to his bed place—had to be removed. The dog that bit him was wandering through the country, "raging mad," and bit dogs and pigs, that died rabid. "There is something surprising," says Van Swieten, "in the poison of this disease (hydrophobia), which will lie dormant for a long time without showing itself by any apparent signs, and yet, when it becomes active, raises a most acute disorder, which commonly kills before the fourth day."

SANITARY AND SOCIAL SCIENCE.

REPORTS ON CITIES, TOWNS, & DISTRICTS.

SANITARY STATE OF CARDIFF.

THE North district of Cardiff comprises that portion of the town which extends from Crockherbtown to Castle Street; it includes all streets opening into this line, being bounded on the south by Quay Street, Church Street, continued on through Ebenezer Street to Charles Street. It is upon a higher level than the other portion of the town. It is inhabited principally by gentry, professional men, and respectable tradesmen. It contains but few courts, these being in good condition, both pitched and paved.

The East district embraces Union Street, East Street, and all the adjacent streets lying between these and the upper part of the Canal, bounded on the north by a portion of that district, and on the south by Bute Terrace and Whitmore Lane, as far as Lewis Street, but does not include that lane. Its inhabitants are a few tradesmen, respectable mechanics, and labourers. Some of the streets—as Stanley Street, Love Lane, and Mary Ann Street—containing Irish lodging-houses. All the streets are pitched and paved; the district has very few courts.

The West district comprises the streets between the Canal, Lewis Street, and the river Taff. In this district, St. Mary Street is inhabited by respectable tradesmen and others. The district has many courts in a bad sanitary condition, as Landore Court, Mill Lane Court, Evans's Court, and others. They are occupied by labourers and indigent Irish, who live in common lodging-houses.

The South district embraces Bute Street, and all the streets in Bute Town; is inhabited by respectable tradesmen, a better class of labourers, and, near the dock, by agents and others connected with the shipping. Nearly the whole of these streets are unpitched, very inefficiently drained, and, being situate on a very low level, usually contain stagnant water and much mud, mixed with refuse vegetable matter. The area behind most of the houses occupied by labourers, being a large proportion, is frequently flooded with fœtid water and cesspool soakings, the alluvial clay, on which this district is built, preventing the water from percolating.

The Newtown district is that portion of the town on the eastern side of the Taff Vale Railway. It has a low level; the streets have recently been pitched; the houses for the most part

are occupied as Irish lodging-houses, and are seriously overcrowded.

The drainage of the town, except in the South district, is in rapid progress towards completion; is already made available in removing the surface water from the Newtown district, and has exercised a very beneficial influence on the health of the inhabitants of that district.

The water supply of the town is now good and ample. The Water Works Company supply about 2,700 houses. The water is obtained from Ely, is good for consumption, and, giving only five degrees of hardness, is equally applicable for household purposes. Their scale of charges enables, in many instances where it is desirable, its supply to be enforced, and has been a great boon to occupiers of small tenements.

The meteorological peculiarities of 1855 were as follows:—The winter and spring quarters were unusually cold, the mean temperature being most weeks below the average of previous years, with the exception of a few days in April, but it soon became cold again, and continued so until the end of May. The prevailing winds were N.N.E. In June, the weather was remarkable for sudden changes from heat to cold. In July, the temperature was high; and warm weather continued through August, September, and the early part of October; November was cold and gloomy; the temperature was below the average in the early part of December, but rose the latter end of the month. The fall of rain throughout the year was below the average.

The population of Cardiff is now computed to exceed 25,000, and is supposed to increase yearly at the rate of eight per cent., being the proportionate rate of increase for the ten years previous to the last census, and which increase, we have reason to infer, has been since maintained. The difference therefore between the increase by births, 458, and the actual increase, 2,000, on the population, is made up by the immense yearly immigration.

Assuming the population of Cardiff now to exceed 25,000, and the number of deaths for the year 1855 being 641, the rate of mortality has been 25.64 per thousand, or rather more than 2½ per cent. The rate of mortality of all England is slightly above 2 per cent.; but this includes rural and town districts, and does not therefore contrast fairly with Cardiff, entirely a town district.

Perhaps the most unfavourable aspect under which the mortality of Cardiff, during 1855, can be viewed, is when we consider the rate of infant mortality. Thus, the number of children

who died under five years during this period has been 306, or 47.73 on the total number of deaths of all ages.

The greatest evil to which I have to direct attention on the present occasion, is the overcrowded condition of the houses of the poor, especially in the Newtown district. This arises from the disproportion between the inhabitants and the house accommodation; the landlord taking advantage of the great demand by putting on a rent entailing the necessity of the tenant of the house subletting the rooms, the tenant of the room subletting the beds.

A practical illustration of the great advantages that have been derived from this constant sanitary supervision exercised over the districts, formerly the constant habitats of fever and infectious diseases, will be understood by a comparison of their former and present condition. In the year 1849, an inquiry into the sanitary condition of Cardiff was instituted for the first time, and evidence was given as to the state of Stanley-street, Landore-court, and other localities. The subjoined extracts are made from the Poor Law Medical Relief Book :—

Locality.	TYPHUS FEVER. 1846-47. Cases.	1847-48. Cases.	DYSENTERY. 1847-48. Cases.
Stanley Street	75	23	13
Landore Court	18	24	8
Mary Ann Street	32	4	2
Kenton's Court	14	14	5

In 1849, epidemic cholera prevailed in this town, and caused extensive mortality in the four localities, namely, in—

Stanley Street	19 deaths.
Landore Court	8 „
Mary Ann Street	12 „
Kenton's Court	13 „

After this year, the local authorities instituted a system of supervision, and great attention was paid to these and other localities considered the infected districts. In 1854, cholera again broke out in this town. The benefits of this supervision appear by inspection of the Register Book, showing the mortality in the streets just enumerated; while the following is the comparative effect at the two periods :—

	1849.	1854.
Stanley Street	19	1
Landore Court	8	2
Mary Ann Street	12	2
Kenton's Court	13	0

These localities being inhabited as common lodging-houses, admitted of the application of sanitary supervision. But there were certain other localities not coming under this denomination, to which circumstance it could not be enforced, where the

epidemic prevailed fatally on the two occasions, in the following proportions:—

	1840.	1854.
Millicent Street.....	18	16
Bridge Street	5	5
Great Frederick Street	4	3

This exhibits in a marked degree, the beneficial effect of sanitary supervision when epidemics unfortunately prevail.

During the last two years, not a single death from fever has been registered in Stanley Street, Landore Court, Mary Ann Street, or Kenton's Court; while a reference to the Medical Relief Book, since 1849, rarely shews a case of fever in these streets, the same book proving, that before this period, Stanley Street and Landore Court were rarely ever without a fever. The houses are now cleanly and frequently white-limed, ventilation is enforced, and the atmosphere of the rooms is no longer of that sickening and offensive character which they heretofore presented in so marked a degree.

The means necessary to improve the sanitary condition of the town, which I have more particularly to recommend to notice during the coming year, will be—to reduce the number of inmates in houses when overcrowded—to enforce frequent cleansing and white-liming—to compel owners or occupiers of house property to adopt means for removing accumulations of stagnant water and impurities in the back areas—to enforce bye-laws in reference to the practice of throwing vegetables and other matter into the unfinished streets—and to compel the pitching of courts and alleys, the latter of which produced strong evidence of its salutary effect during the prevalence of the cholera epidemic of 1854. (From a report by H. J. PAINE, Esq., M.R.C.S., &c., Officer of Health.)

MISCELLANEA.

FOOD-GRAINS OF INDIA.

DR. FORBES WATSON, of the East India Medical Service, has recently read at the Society of Arts a most interesting and important paper on the above-named subject; from which we take a few notes. There are in India certain vegetable substances which, according to caste, various classes are permitted to eat,—such as eggs, fish, and flesh of certain animals; but Dr. Watson, in this communication, confines his remarks to the relative nutritive value of the cereals and pulses, two or more of which, combined, constitute the entire

bulk of the solid food eaten by the Brahminical or strict vegetable eating class.

Experience has taught the native how to mix his food-grains—cereal or pulse—so as to secure a true mixed food, fitted at once for the plastic and for the respiratory demands of the economy. To his rice, for respiration, he adds from one-fourth to a fifth of some leguminous seed, his favourite one the *Cajanus Indicus*. The pulses, therefore, are to the Brahmin what beef and other fleshes are to us.

Assuming six to one as the proportion between the carbonaceous and the nitrogenous foods as the requirements of the human system, Dr. Watson very ably shows that for the body to live well, this standard must be approached; that nitrogenous food cannot be applied to the plastic wants of man, unless there is a corresponding proportion of carbonaceous food also supplied; and that the theory which assigns to different substances a value in proportion to their nitrogenous compounds is fallacious.

In a series of elaborate tables, Dr. Watson epitomises the nutritive values of numerous Indian cereals and pulses. He suggests that the *Cajanus Indicus* and "*gram*"—the great horse food of India—two pulses, should be introduced into this country.

In the conclusion of his paper, Dr. Watson refers to two Eastern vegetable products, a knowledge of which is so important that we copy from him *verbatim*.

"The first of these is the *Soja hispida*, called *Bhoot* by the natives, and which I find to contain the enormous quantity of upwards of 46 lbs. per hundred of nitrogenous matter, nearly 12½ pounds of oil or fat, about 13 ounces of phosphorus, one ounce and a quarter of sulphur, and equivalent to nearly half an ounce of iron.

"With regard to it, I have been able to obtain but little general information. In Simmonds' work on the commercial products of the vegetable kingdom, it is referred to as a source of the well-known 'Soy sauce;' but if it could be grown and procured in quantity, as an addition to other food, it probably, for feeding purposes, would be found to exceed in value that of any vegetable substance now known.

"The other product, to which I would briefly refer, is marked as having come from Sumatra. It bears the native name of *Catjang tahoo*, and is probably a Dolichos bean, like the former.

"Of it I have, likewise, been able to obtain only meagre information. In Mr. Simmonds' work, a leguminous plant is

mentioned, which furnishes, on pressure, a residuum known under the name of *Tanping*, and which, in the form of a dry paste, is brought to Shanghai, in a quantity amounting in value to two and a half millions sterling. This last fact is stated on the authority of the Rev. Mr. Medhurst, of Shanghai, and Mr. Thoms, British Consul at Ningpo. The bean referred to is stated as being imported into China,—pressed for its oil, which is used both for eating and burning, and the residuum, in form like large cheeses, is said to be distributed about China in every direction, and used as food for pigs and buffaloes, as well as for manure.

"Although I am not in a position positively to state that the bean which I produce this evening is identical with that referred to, still its composition leads me to infer that, if not the same article, it is one perhaps equally worthy of the attention of the agriculturists of this country. On analysis, I find that it contains per 100 lbs. weight, 39.39 lbs. of nitrogenous matter: 17 lbs. 12 oz. of oil or fatty matter; about 9½ ozs. of phosphorus and nearly two of sulphur."

Our readers will go with us in recording unanimous thanks to Dr. Watson for this great addition to the science of every-day life. It is a home question which he has discussed, and Epicurus is put in the shade. We find that the East India Company Directors assisted Dr. Watson in the pecuniary weight of this inquiry, and as this is greatly to their credit, it ought to be widely known. We hope that they will not stop in so good a work, but encourage their scientific officer to renewed and continued exertions. Such results, as they may thus by a stroke of foresight secure, are not for the good of individual men, but for nations; and what may be considered now as one of their least as well as last acts, may ultimately prove the greatest and best.

LOCAL BOARDS OF HEALTH IN ENGLAND.

THERE are now in England no less than one hundred and ninety-six local Boards of Health, all of which have been established since the cholera outbreak of 1848. Many of these have borrowed money for their works, which will soon be returned with interest.

PROGRESS OF EPIDEMICS.

LOCAL REPORTS OF EPIDEMIC AND ENDEMIC DISEASES

During the Months of September, October, and November, 1857.

Place.	County.	Lat.	Long.	Observer.
St. Mary, Scilly	Cornwall -	49.50 N.	6.24 W.	J. G. Moyle, Esq.
Teignmouth -	Devonshire -	50.32 N.	3.29 W.	W. C. Lake, Esq.
Odiham - -	Hampshire -	51. 8 N.	1. 3 W.	J. McIntyre, M.D.
Canterbury -	Kent - -	51.17 N.	1. 4 E.	G. Rigden, Esq.
Chatham -	Kent - -	51.21 N.	0.14 E.	F. J. Brown, M.D.
Wandsworth -	Surrey - -	51.28 N.	0. 7 W.	G. E. Nicholas, Esq.
Putney - -	Surrey - -	51.28 N.	0. 8 W.	R. H. Whiteman, Esq.
Up. Holloway	Middlesex -	51.32 N.	0.03 E.	W. B. Kesteven, Esq.
Swansea -	Glamorgansh.	51.38 N.	3.50 W.	W. H. Michael, Esq.
Colchester -	Essex - -	51.54 N.	0.52 E.	Henry Laver, Esq.
Aspley Guise -	Bedfordshire -	52. 1 N.	0.37 W	J. Williams, M.D.
Saffron Walden	Essex - -	52. 3 N.	0.12 E.	T. Spurgin, Esq. H. Stear, Esq.
Bedford - -	Bedfordshire -	52. 8 N.	0.51 W.	T. H. Barker, M.D.
Newpt. Pagnell	Buckinghams.	52.10 N.	0.42 W.	G. O. Rogers, Esq.
Sharnbrook -	Bedfordshire -	52.12 N.	0.40 W.	R. S. Stedman, Esq.
Wellingbro' -	Northamptons.	52.20 N.	0.40 W.	B. Dulley, Esq.
Beccles - -	Suffolk - -	52.25 N.	1.48 E.	W. E. Crowfoot, Esq.
Thetford -	Norfolk - -	52.26 N.	0.45 E.	H. W. Bailey, Esq.
Stourbridge -	Worcestersh. -	52.28 N.	2.32 W.	A. Freer, Esq.
Dudley - -	Staffordshire -	52.30 N.	2.10 W.	J. H. Houghton, Esq.
Barrowden -	Rutland -	52.34 N.	0.38 W.	H. J. Swann, Esq.
Wisbeach -	Cambridgesh.	52.39 N.	0. 5 E.	W. H. Hole, Esq.
East Dereham	Norfolk - -	52.40 N.	0.57 E.	J. Vincent, M.D.
Pontesbury -	Shropshire -	52.43 N.	2.50 W.	Wm. Eddowes, Esq.
Nottingham -	Nottinghamsh.	52.50 N.	1.10 W.	T. Robertson, M.D.
Burton-on Trt.	Staffordshire -	52.53 N.	1.53 W.	S. Thomson, M.D.
Oswestry -	Shropshire -	52.53 N.	2.59 W.	P. Cartwright, Esq.
Wrexham -	Denbighshire -	53. 2 N.	3. 1 W.	E. Williams, M.D.
Hawarden -	Flintshire -	53.11 N.	3. 2 W.	T. Moffat, M.D.
Lincoln -	Lincolnshire -	53.12 N.	0. 5 W.	S. Lowe, Esq.
Alford - -	Lincolnshire -	53.15 N.	0. 6 E.	R. U. West, M.D.
Gainsborough	Lincolnshire -	53.23 N.	0.47 W.	D. Mackinder, M.D.
Liverpool -	Lancashire -	53.24 N.	2.59 W.	Thos. Bickerton, Esq.
Warrington -	Lancashire -	53.25 N.	2.32 W.	C. N. Spinks, Esq.
Wigan - -	Lancashire -	53.32 N.	2.33 W.	Jephtha Hussey, Esq.
Bolton - -	Lancashire -	53.35 N.	2.19 W.	W. H. Pendlebury, Esq.
Bramley -	Yorkshire -	53.49 N.	1.38 W.	J. N. Radcliffe, Esq.
York - -	Yorkshire -	53.58 N.	1. 3 W.	W. Procter, Esq.
Wst. Auckland	Durham -	54.45 N.	1.40 W.	G. Todd, Esq.
Rothbury -	Northumberld.	55.25 N.	1.50 W.	E. C. Summers, Esq.
Lerwick -	Shetland Isles	60. 9 N.	1. 8 W.	G. W. Spence, M.D.

QUARTERLY STATEMENT—No. XII.

[*The dates denote that the disease appeared in the weeks then ending.*]

SCARLET FEVER.

Canterbury—Sept. 11, all Oct. and Nov.
Chatham—September 18
Putney—October 16-30, all Nov.
Upper Holloway—October 16, 30
Bedford—All November
Beccles—All Sept., Oct. 2-16, all Nov.
Thetford—November 6-13, 27
Stourbridge—Sept. 11-18, Oct. 2, 16, 30
Dudley—Sept. 18-25, Oct. 2, 16, Nov. 13-
Wisbeach—November 20-27 [27
Wrexham—All November

Hawarden—November 13
Lincoln—Oct. 23-30, all November
Gainsborough—Every wk. except Nov.
Liverpool—Every week [20
Wigan—October 9, November 6, 27
Bolton-le-Moors—Sept. 4-18, Oct. 9-30, all November
York—Sept. 11, 25, October 2, 16-30
West Auckland—Every week

MEASLES.

Scilly Isles—Sept. 11, October 2-16
Canterbury—All November
Chatham—Sept. 25, Nov. 20-27
Wandsworth—November 20
Colchester—September 25
Saffron Walden—September 11-18
Beccles—All November
Thetford—September 4-18
Dudley—Sept. 4, 25, October 16
Barrowden—Oct. 9-30, all November
East Dereham—All November
Lincoln—October 2-16
Liverpool—Every week
Gainsborough—Sept. 25, October 2
Bolton-le-Moors—Sept. 18 25, Oct. 2, 23-30, November 6-13
Bramley—November 20

SMALL POX.

Bedford—November 20-27
Stourbridge—September 4-18
Dudley—October 30, November 13
Wisbeach—October 23-30, all Nov.
Pontesbury—November 13-27
Oswestry—October 2
Wrexham—November 27
Hawarden—October 23-30
Liverpool—Every week
Wigan—Sept. 26, October 16, Nov. 6
Bolton-le-Moors—Sept. 4-11, October 23-30, November 6
York—Sept. 4-18, all Oct., Nov. 6-20

HOOPING COUGH.

Chatham—Sept. 11-25, October 2, 16, November 13-27 [27
Upper Holloway—All Sept., Nov. 13-
Colchester—All October & November
Saffron Walden—Sept. 11, Oct. 23
Bedford—November 6-13
Sharnbrook—November 13-27
Wellingborough—November 27
Dudley—October 9, 30, Nov. 6, 27
Wisbeach—All November
East Dereham—All October and Nov.
Pontesbury—All Sept. & Oct., Nov. 6
Burton-on-Trent—All September
Oswestry—Every week
Wrexham—October 16-30, Nov. 6-13
Lincoln—November 13
Alford—October 9-16
Gainsborough—September 18
Liverpool—Every week
Wigan—September 25, November 13
Bolton-le-Moors—Sept. 11-18, Oct. 2-
York—Oct. 2, 30 [16, 30, all Nov.

CROUP.

Chatham—Sept. 4, Oct. 2, Nov. 20-27
Putney—September 25, October 2
Aspley Guise—November 20-27
Saffron Walden—October 30
Newport Pagnell—November 6
Thetford—November 6-13
Stourbridge—November 13-27
Wisbeach—November 20-27
Pontesbury—October 23
Burton-on-Trent—November 13
Oswestry—October 2-9, Nov. 13-27
Lincoln—November 13-27
Alford—September 25 [Nov. 13-27
Liverpool—Sept. 18-25, Oct. 2-9, 30,
Bolton-le-Moors—Sept. 25, Oct. 2, 30,
Bramley—November 20 [Nov. 6-13

CATARRH.

Scilly Isles—All November [13, 27
Teignmouth—All Sept., Oct. 2, Nov. 6-
Odiham—October 16-30, Nov. 6-20
Chatham—Sept. 4, Oct. 16-30, all Nov.
Wandsworth—All Sept., October 2-9, 23-30, November 13-27
Putney—September 11-25, Oct. 2-9
Upper Holloway—October 30, Nov. 6
Aspley Guise—All November
Saffron Walden—Sept. 25, Nov. 13-27
Bedford—November 27
Newport Pagnell—All November
Sharnbrook—Every week
Wellingborough—November 13 27
Beccles—Sept. 11-18, October 9 30
Thetford—Sept. 4-11, 25, October 9-16, 30, all November
Stourbridge—Sept. 4-18, Oct. 9-30, all
Dudley—October 30 [Nov.
Wisbeach—All October & November
Burton-on-Trent—November 6-20
Oswestry—November 20-27
Wrexham—October 30, all November
Gainsborough—Sept. 25, all Oct. & Nov.
Liverpool—Every week
Bolton-le-Moors—Sept. 11-18, Oct. 9-
Bramley—All Nov. [30, all Nov.
Rothbury—November 20-27
Lerwick—Sept. 4, Oct. 23, Nov. 13-27

INFLUENZA.

Teignmouth—Sept. 11-18, Nov. 20 27
Odiham—October 30, Nov. 6-13
Chatham—Sept. 11, 25, Oct. 16-30, all
Wandsworth—Nov. 13 27 [Nov.
Putney—October 16-30, all Nov.
Upper Holloway—November 6, 20-27
Colchester—November 13 27
Aspley Guise—November 20-27

Saffron Walden—Sept. 18-25, Oct. 2,
Bedford—Nov. 13-27 [Nov. 13-27
Newport Pagnell—Sept. 4-11, 25, Oct.
Wellingborough—All Nov. [2, all Nov.
Thetford—Sept. 11, 25, Oct. 2-9, 23, all
Stourbridge—Nov. 20-27 [Nov.
Pontesbury—November 13, 27
Wrexham—All November
Hawarden—October 16-23
Lincoln—October 30, all November
Liverpool—Every week
Wigan—Oct. 16-23, Nov. 6, 20-27
Bolton-le-Moors—Every week
Bramley—November 20-27
York—Sept. 25, all Oct., Nov. 6-20
Lerwick—November 27

ERYSIPELAS.

Odiham—November 13
Canterbury—Sept. 25 [Nov. 13-20
Chatham—Sept. 11, 25, Oct. 2, 16, 30,
Wandsworth—Sept. 18, Oct. 23-30,
Putney—November 13 [Nov. 6
Saffron Walden—Sept. 25, Nov. 13
Bedford—September 4 11
Newport Pagnell—Sept. 4-11, Oct. 16-
Sharnbrook—Oct. 9-16 | [30, Nov. 6
Wellingborough—Sept. 25, Oct. 2-9, November 20-27
Beccles—September 4, Nov. 13-20
Thetford—Sept. 4, 18, October 16
Stourbridge—October 30, Nov. 20
Dudley—Sept. 4, Oct. 2, Nov. 27
Wisbeach—November 20-27
Pontesbury—September 4-18
Burton-on-Trent—October 9
Oswestry—All Sept., Oct. 2, Nov. 20-27
Lincoln—All November
Alford—October 9
Gainsborough—Sept. 4, Oct. 9-16, Nov.
Liverpool—Every week [6-13
Bolton-le-Moors—Sept. 11, Oct. 9-16,
Bramley—Nov. 27 [30, Nov. 6-13
Lerwick—September 4

CHOLERA (ENGLISH).

Chatham—September 4, 18
Newport Pagnell—Sept. 18-25, Oct. 9-
Wellingborough—Sept. 4-18 [23
Beccles—September 18
Thetford—Sept. 18, Oct. 9, 30, Nov. 6
Stourbridge—All Sept., Nov. 27
Pontesbury—September 4, 18
Wrexham—September 11-25
Alford—September 18 25
Liverpool—All Sept., Oct. 2, 16
Bolton-le-Moors—Sept. 4-18, Oct. 2-9
Bramley—September 25, October 2

AGUE.

Canterbury—Sept. 11-18, all Oct. & Nov.
Chatham—Every week
Colchester—Every week
Wisbeach—Every week
Alford—October 16-23
Liverpool—September 11, 25

REMITTENT FEVER.

Teignmouth—Sept. 11-25, Nov. 6, 20-27
Odiham—Oct. 9, 23-30, Nov. 6, 20
Putney—Oct. 16-30, Nov. 6-13
Upper Holloway—Sept. 18-25
Saffron Walden—Oct. 2-16, Nov. 13-27
Newport Pagnell—September 18-25
Beccles—Sept. 4, Oct. 23-30, Nov. 6
Thetford—Sept. 11, 25, Oct. 16
Dudley—September 2
Barrowden—Sept. 11-18, Oct. 30
Burton-on-Trent—September 18-25
Oswestry—All October and Nov.
Alford—Sep. 11-25, Oct. 9 16, Nov. 20 27
Gainsborough—Sept. 18-25, Oct. 2-9
Liverpool—Every week
Wigan—Oct. 16-23, Nov. 6
Bolton-le-Moors—Sept. 18-25, Oct. 2-9, 30, all November
York—Sept. 11, 25, Oct. 30, Nov. 6

DIARRHŒA.

Scilly Isles—All Sept., Oct. 2-16, all Nov.
Teignmouth—All Sept., Oct. 2-9, Nov.
Odiham—October 2-16 [6, 20
Canterbury—Every week
Chatham—All Sept. & Oct., Nov. 6-13
Wandsworth—All Sept., Oct. 2-16, 30, November 6
Putney—All Sept., Oct. 2-16, Nov. 13-20
Upper Holloway—All September
Colchester—Every week
Aspley Guise—All Sept., Oct. 2-16
Saffron Walden—Every week
Bedford—Sept. 4-11, 25, Oct. 16-23, November 6-13
Newport Pagnell—Every week except
Sharnbrook—Every week [last
Wellingborough—All Sept., Oct. 2-16
Beccles—All September
Thetford—All Sept., Oct. 2-9, 23 30, Nov. 6-13, 27 [20-27
Stourbridge—All Sept., Oct. 9 23, Nov.
Dudley—All Sept., Oct. 2, 16-30, Nov. 6, 20-27 [Nov. 13
Barrowden—Sept. 11 25, Oct. 9-30,
Wisbeach—All Sept., Oct. 2-9
East Dereham—All Sept., Oct. 2
Pontesbury—Sept. 11-25, Oct. 2-23
Burton-on-Trent—Sept. 11-25, Oct. 9,
Oswestry—Every week [23-30
Wrexham—All Sept, Oct. 2-16
Hawarden—All October, Nov. 6-20
Lincoln—October 16-30, Nov. 6
Alford—All September and October
Gainsborough—All Sept. & Oct., Nov. 6
Liverpool—Every week
Wigan—Sept. 4-18, Oct. 16, 30

Bolton-le-Moors—All Sept., Oct. 2-16, 30, November 6
Bramley—Sept. 4, 18-25, Oct. 2-16, 30
York—Oct. 9, 23-30, Nov. 13-20 [6
Rothbury—Sept. 11, 25, Oct. 16-30, Nov.
Lerwick—Sept. 4, 25, Oct. 16-30, Nov. 6-20

DYSENTERY.

Odiham—November 20-27
Chatham—All Sept., October 2-16, 30, November 13 [20
Wandsworth—Sept. 4, 18, Oct. 2, Nov.
Saffron Walden—Sept. 11, Oct. 2
Newport Pagnell—Sept. 4, Nov. 20
Sharnbrook—Sept 4, Oct. 30
Wellingborough—All Sept., Oct. 2
Stourbridge—September 4-11
Wrexham—All September, Oct. 2
Lincoln—October 16-23
Alford—All September
Gainsborough—All Sept., Oct. 2-9
Liverpool—Every week
Wigan—Sept. 4, 18, Oct. 16
Bolton-le-Moors—All Sept., Oct. 2-9, November 6-20
Bramley—All Sept., Oct. 2, 16, 30, Nov.
Lerwick—September 25 [6, 27

TYPHUS.

Canterbury—Every week
Chatham—Every week
Wandsworth—Sept. 4, Nov. 13
Putney—October 30
Upper Holloway—Sept. 25, Oct. 2
Saffron Walden—Every week
Newport Pagnell—Sept. 18-25, all Oct.
Sharnbrook—Oct. 9-16, 30 [& Nov.
Wellingborough—Every week
Beccles—All Sept., Oct. 23-30, Nov. 6-13
Thetford—Sept. 4-11, 25, Oct. 9, 23-30,
Dudley—Every week [Nov. 13-27
East Dereham—All November
Pontesbury—November 13-27
Oswestry—Sept. 18, Oct. 9
Wrexham—September 4-18
Lincoln—Oct. 9-30, all November
Alford—September 4, November 6
Gainsborough—All Oct. and Nov.
Liverpool—Every week
Wigan—September 4, October 16
Bolton-le-Moors—Sept. 4-11, Oct. 2-9,
York—Oct. 9, 22 [23-30, all Nov.
West Auckland—All Oct. and Nov.
Rothbury—Oct. 2-9, Nov. 20

TYPHOID FEVER.

Colchester—Every week
Stourbridge—September 4-11
Lerwick—November 6

PUERPERAL FEVER.

Thetford—October 23
Alford—September 18
Bolton-le-Moors—Sept. 18 25, Oct. 23

CARBUNCLE.

Teignmouth—November 20
Odiham—Sept. 25, Nov. 20
Canterbury—All September
Chatham—October 16, Nov. 6
Colchester—September 18
Saffron Walden—Sept. 11, Oct. 2-9, 30, November 13-27
Sharnbrook—Sept. 4, all Nov.
Thetford—November 13
Stourbridge—November 6-13
Oswestry—October 2-16, Nov. 27
Alford—Sept. 4-11, Oct. 30
Liverpool—Sept. 11, 25, Oct. 2, 16-23, November 6, 20-27
Bolton-le-Moors—Sept. 11-18, Oct. 23
Rothbury—October 2

MUMPS.

Lerwick—October 30, Nov. 20

DIPHTHERITE.

Canterbury—Every week

ADDITIONAL OBSERVATIONS.

Scilly Isles.—Mr. Moyle observes: "We had one case of measles in September, and three in the first half of October, all mild in character. The case in September was imported into the island from Newlyn, a fishing town close to Penzance, where measles were rife. The diarrhœa in October and November attacked more particularly children, and especially infants at the breast. It was attended, in many instances, with choleraic vomiting. Several of the infants were almost in a state of collapse, cold and blue: they all recovered, however, with stimulating remedies; one infant at the breast taking twenty drops of brandy at a dose. Chalk mixture, with a small proportion of opiate, stilled the diarrhœa. The cases of catarrh were numerous, but uncomplicated, and only requiring com-

mon domestic remedies. The weather during September was very fine and warm, the mean temperature for the month being 68° Fahrenheit: the prevailing winds were from the east, and the rain gauged 2.69 in. October was a very wet month, the rain gauged amounting to the large quantity (for Scilly) of 4.60 inches. Several gales of wind occurred, and the whole month was cold and uncomfortable. The mean temperature was 52° Fahr., the prevailing winds north-east and south-east. November to the 27th has been fine. The rain gauged has been 1.27 inch. The weather has been mostly clear, and the prevailing winds from the east and the south. The mean temperature of the month has been 58° Fahr. The deaths for the quarter have been six: one from traumatic tetanus; one from phthisis in a woman; one from marasma from aphthous ulceration of the mouth and fauces in a child; one from softening of the brain in a woman; one from laryngismus stridulus (a child); one woman from uterine hæmorrhage. The population of the islands is 2,600."

Teignmouth.—Mr. Lake writes: "September was, on the whole, a fine month; the temperature decreasing, but still above the average, the difference between the degree of humidity of this month and the last being greater than ordinary; the fall of rain 1.112 in.; about the average. October was a very rainy month, the temperature being still above the average. Barometric pressure during this month was low. On the 8th it fell lower than I had before registered it (28.723). The total amount of rain that had fallen in the four months of June, July, August, and September, had been 3,608 inches. In October alone there fell 4.666 inches. November was at first mild and damp; during the middle of the month cold, with N. and N.E. winds; then for a few days mild and damp, and during its close again cold and bleak. From October 7th to 21st barometric pressure was high. On the 12th the glass reached a higher point than I had before noticed it at, viz. 30.671. 1.846 inches of rain fell during this month. The mean degree of ozone for the three months of the quarter was as follows:—September, 5.6; October, 4.8; November, 3.1. Diarrhœa had not appeared in force till the latter part of August. It prevailed increasingly through September, subsiding towards the end of October. Tonsillitis was common during the latter part of October and in November. Some cases came under my notice, amongst children, of a diphtheritic character, but in which the local affection was not so formidable as the constitutional. The blood-making powers of the system were apparently much compromised; the little patient, after the subsidence of the throat affection,

either sinking through a general failure of the powers of life (without anything like typhoid symptoms), or left in a state in which he is liable to be carried off by any prevalent disorder; or, during convalescence, continuing unusually weak and anæmic."

Chatham.—Dr. Brown writes: "Typhoid fever has continued to prevail. The complications have been both cephalic and abdominal. Intestinal hæmorrhage has proved fatal in many cases. The head affection has presented the following characteristics:—Intense tinnitus, vigilance, flushed face, and, in some cases, screaming and delirium. The symptoms have, in almost all cases, yielded to a few leeches, small blisters, the adminstration of iodide of potassium, and the inunction of strong mercurial ointment over the forehead. Diphtheritis was observed in the week ending 23rd October, and in the same week cases of cholerine. The influenza, that has prevailed during the last seven weeks, has been marked by severe but short-continued symptoms. It has put on the character of suffocative catarrh, which has suddenly disappeared in less than four—in even two days. A girl, aged 25 years, died in two days of this affection in the week ending 27th November. Very many persons were prostrated on one day, and walking about a few days afterwards. A convulsive cough,—a quasi-hooping-cough,—now succeeds to the influenza, and affects adults as well as children."

Wandsworth.—Mr. Nicholas says: "The past quarter has been characterised by an almost entire absence of the exanthemata. Diarrhœa prevailed extensively at the commencement, and influenza, with much lung disease, at the latter part of the above period. During the continuance of the last-named epidemic, all disease was attended by a very marked depression of the vital powers.

Putney.—Mr. Whiteman writes: "Diarrhœa, of which several cases assumed a severe choleraic form, was the prevailing epidemic during September and the early part of October. Scarlatina, although very prevalent during October and November, was comparatively light and yielding, resulting in death in no one instance. Catarrhal affections, and that severe form of catarrhal fever, known as influenza, have been unusually prevalent throughout the entire quarter. The mortality of the district has been very considerably below the average of corresponding seasons of many years past. A good criterion of the state of the public health of a district is always to be found in the records of disease and mortality amongst the poor of such district. My last quarterly summary, as returned to the Board of Guardians, was of a most satisfactory

character. Out of about two hundred cases of disease, of greater or less severity, there occurred but two deaths in this parish amongst the pauper class, in the thirteen weeks referred to, viz., a woman, aged 99, from natural decay, and a child, aged 7, who succumbed to a very severe burn. Not one poor person, therefore, can be said to have died during the quarter from actual disease."

Colchester.—Mr. Laver says: "During this quarter vegetation has generally been healthy, excepting potatoes, which are much diseased in many parts; apples appear to be diseased in a similar manner to potatoes; there have also been a few isolated cases of pleuropneumonia amongst cattle. Typhoid has been very prevalent, particularly in low and marshy districts with a bad water supply. The large number of cases of tonsillitis I have seen have appeared to be infectious, whole families suffering. I have not seen or heard of any cases of diphtherite. The worst cases of typhoid I have attended have occurred in patients drinking water from two shallow wells, the water of which is full of infusoria."

Saffron Walden.—Mr. Spurgin says: "The quarter has been unusually healthy, and, with the exception of diarrhœa, there has been no general disease. Vegetation has been unusually late, from the extreme mildness of the weather and absence of frost, which has prolonged the growth of the vegetable kingdom."

Mr. Stear says: "Diarrhœa still continues, but the cases are neither so severe or numerous as they were. Pulmonary affections have been frequent during the last month of the quarter. Fever cases are more frequent at the present time than they have been at any time before during the three years I have held the district, though the number of sick poor is below the average. Grass, etc., has grown remarkably during the past autumn. There has neither been any frosty weather nor fall of snow at present."

Bedford.—Dr. Barker reports that fever prevailed in this town and neighbourhood during the entire quarter.

Sharnbrook.—Mr. Stedman says: "Diarrhœa has been prevalent during the whole of the quarter. Of typhus, four cases came under my notice, two of which were fatal. In these two, epistaxis was of almost daily occurrence, and also most profuse perspiration. In a village about six miles from here, fever has prevailed to a great extent. The population, according to the last census, is 845; and I am informed by Mr. Purday, the medical officer of the district, that for some weeks during the last two months, he has been returning as many as one hundred and twenty cases to the Board of Guardians weekly,

exclusive of cases occurring in private practice. This village, Bozeat, is notorious for its deficient drainage, and has a wide open ditch traversing it, which receives all the filth and drainage of the village. Several very heavy falls of rain have occurred during the quarter. Up to this date (November 30th) there has been no frost. Many half-hardy plants,—such as the scarlet geranium, the heliotrope, nasturtium, fuschia, French beans, and others, which are generally the first to die from cold, are still green, and in some cases bearing flowers."

Wellingborough.—Mr. Dulley writes: "Although the cases of fever are entered under the head of typhus, they have been, with one exception, typhoid cases, and seem to be of an epidemic character, visiting alike the ill-drained and the best drained part of the town, in which have been recently laid down new sewerage drains and pipes, very badly done, so much so that the pipes are frequently useless in carrying off the filth of the neighbourhood, and thereby causing much and offensive effluvia; and even if this be not the cause of the fever, it, at all events, much retards the recovery of those unfortunate patients who live in the vicinity."

Beccles.—Mr. Crowfoot says, that scarlet fever, measles, gastric and typhus fever, have been very prevalent; the gastric fever has been accompanied, in many cases, with diphtherite, which has been the occasional cause of death.

Thetford.—Mr. Bailey furnishes the following observations for the Quarter:—"September.—The thermometrical range assumed an autumnal one; the difference between the highest and lowest temperature being much less. Both the midnight thermometer and that on the grass were comparatively high. There were only three degrees between the mean temperature and the dew point; this indicated the air to be nearly saturated with moisture, which was the cause of the thick fogs and dew in the mornings. The thermometer was unusually high, being 5° above the average of last September. The highest was 76°, and lowest 50°, the range only 26°. The barometrical mean for the month was 29.88¼. Among the most prevailing diseases of the month was diarrhœa, which, in some cases, was so severe as to put on a choleraic form; the cramps in the legs and hands being dreadfully severe, with constant watery evacuations. A sudden and fatal case occurred in a servant girl, who died after two hours, and before any medical aid could be given her. With children and infants the disease was very prevalent, but no death took place. We had also a visitation of measles, imported here by some travellers, whose children were suffering at the time with the disease; the type was mild, requiring but little medical attention, and did not extend beyond a family or

two. Two cases of erysipelas came under notice. The first patient was the wife of a labouring man—the face and head became swollen, with high delirium and fever. This lasted some days, and then gradually subsided. Her sister, who came over to nurse her, continued in perfect health during her illness, and having left some days, I was requested to visit her, and found her face affected with severe erysipelatous inflammation; thus showing its infectious nature in this instance. Catarrhs and influenza were less prevalent than usual; but several cases of typhoid fever came under treatment, arising, I consider, more from atmospheric causes than from any predisposition to it from poverty of living, etc. Two or three in a family were attacked. Rheumatism and pleurisy attacked the working labourers, arising from the heat, exposing themselves to sudden changes while under profuse perspiration. The casual diseases under treatment during the month were syphilis, neuroses, nephritis, consumption, gastritis, dyspepsia, and some cutaneous diseases.

"October.—Although we experienced but little wind throughout the month, yet the atmospheric pressure was very variable, the range being 1.2 inch. The temperature was less, the highest degree being 68°, and the lowest, 39°. This unequal pressure caused a higher amount of rain than usual, being 2.5 inches; on the day and night of the 22nd, 1.25 inch fell. The prevalent complaints were chiefly catarrrhal affections, and influenza, attacking elderly persons. Diarrhœa was prevalent in some cases, in a severe form, producing the greatest prostration I ever witnessed. In children it was fatal from exhaustion. Erysipelas occurred in a lady, attacking the face and head, producing considerable constitutional irritation, but which did not extend to any other branch of the family. Several cases of typhoid fever, which may be considered epidemic, attacked families in various parts of the town, running their usual course, and leaving the usual sequelæ, such as anasarcous legs, boils, etc. With children, ulcerated sore throats were prevalent, accompanied with considerable fœtor. One case terminated fatally in a few days. In the neighbourhood, many cases of the same kind occurred, requiring great attention and active treatment. Pleurodynia, rheumatism, and cynanche tonsillaris, were very prevalent during the month, which may be attributed to the variable pressure and moist heat throughout the month. A fatal case of puerperal fever occurred in a lady. Although every medical care and skill were given, she sank, leaving a large family to deplore her loss, and the regret of numerous friends. The casual complaints were, within the month, menorrhagia, tic-douloureux, cancer uteri, gout, indigestion, chicken-pox, and psora.

"November.—We had a high barometrical range during the month, together with a higher temperature than usually occurs at this season; so that the vicissitudes were less felt. A remarkable circumstance was the little wind occurring; especially as the month is generally remarked for high winds and gales. The temperature was 8° higher thaa last November. The diseases were not numerous. By the schedule, it will be observed that some cases of scarlatina are recorded. These cases were confined to only one part of the town; how they were imported, I have been unable to ascertain. The disease has been rather severe; the throat much swollen and inflamed; and the febrile symptoms very high. Every precaution is taken to stop its extension, and at the present time no further case has occurred. Two cases of croup occurred; one terminating fatally and suddenly, and the other, in a girl of ten years, which has yielded to active treatment, and is now convalescent. Catarrhal and bronchial affections are very prevalent. Diarrhœa still continues with us, attacking all grades of society, as in last month. Typhoid fever became epidemic, occurring in isolated places, attacking several in a family at the same time. For many years I have not known the disease so prevalent. Had provisions been dear, the poor would have suffered similar to the prevalence of the disease in 1814. Only one death has occurred. The casual diseases in the month under notice were, inflammation of the colon, abortion, dysphagia, gout, cephalitis, apoplexy, amenorrhœa, syphilis, paraphimosis, porrigo, psora, herpes, and ringworm. Upon inquiry of our veterinary surgeons, I find there has been much disease among the cattle, chiefly lung disease, which has proved very fatal in this neighbourhood. With horses, sore throats, fevers, and bowel disorders have been the prevalent complaints. No disease with the sheep. They were never known more healthy or in better condition."

Record of Deaths in Twenty-one Parishes (*population* 9,574) *from the Registrar's Book.*

Sept.		*Oct.*		*Nov.*	
Diarrhœa	2	Consumption	2	Typhoid fever.....	1
Choleraic diarrhœa .	1	Bronchitis	2	Puerperal fever	1
Intermittent fever ..	1	Croup	1	Bronchitis	1
Aphtha	1	Malig. ulcer of throat	1	Croup	2
Consumption	4	Convulsions	1	Apoplexy.....	1
Asthma	1	Congestion of brain.	1	Spina bifida	1
Diseased heart	1	Spinal disease.....	1	Inflamm. of womb..	1
Rupture of the aorta	1	Atrophy	2	Dropsy.....	1
Apoplexy.....	2	Debility	3	Debility	1
Fits	1	Decay of nature	1	Decay of nature	3
Dropsy.....	1				
Hanging	1				
	17		15		13

Stourbridge.—Mr. Freer says: "The season has hitherto been dry—the number of chest affections much smaller than usual. Two cases of diphtherite have come under my notice during the last fortnight; one (my nephew), died on the fifth day; the other (sixteen months old), on the fourth. This case of diphtherite occurred near Bewdley, at a country house. The next house is about one hundred and fifty yards distant, and in this a fatal case of the same disease happened about two years ago. There has been a severe epidemic of pleurisy and pneumonia in horses in the neighbourhood, during the last month. I am told depletion is very badly borne in this; many of the animals require ammonia, freely given as a stimulant on account of the early appearance of prostration. Vegetation is forward, as shewn by the blossoming of the strawberry in some instances, and the appearance of the tulip above ground in others."

Dudley.—Mr. Houghton says: "377 deaths were registered in Dudley the last quarter, which is far above the average,—175 of these from zymotic diseases. Small-pox and measles have slightly decreased, but there has been a great increase in the number of deaths from diarrhœa and scarlet fever; 99 deaths occurred from diarrhœa; 19 from scarlet fever; 15 from small-pox; 24 from fever; 9 from croup; 3 from hooping cough; 2 from measles; 2 from catarrh; 1 from puerperal fever; and one from dysentery. The deaths from zymotic diseases are one in 2.17 of the whole. Hence the positive and relative mortality of Dudley continues excessive. Three cases of diphtherite have came under my observation. They were well marked. They all occurred in persons in the prime of life and well to do; were all associated with the best sanitary state: all shewed symptoms of alarming prostration, but all recovered. They were treated with tincture of sesquichloride of iron and hydrochloric, and internally with stimulants and nutriments almost *ad libitum*. A strong hydrochloric acid lotion was frequently applied to the exudations with the best result. Influenza was very prevalent amongst cattle and horses."

Barrowden.—Mr. Swann says:—"During this quarter measles have appeared at Morcott; and although it has gone through the place, I can hear of no deaths. It has been of a mild character. Diarrhœa has not been so prevalent this quarter; three cases of remittent fever have occurred in Barrowden; but the quarter altogether has been much more healthy than last. The potato disease is very bad, the tubers having gone since they have been housed."

East Dereham.—Measles were very prevalent; the disease was generally very mild. Pleuropneumonia had been prevalent among cattle.

Pontesbury.—Mr. Eddowes says that one case of small-pox occurred in a girl, aged 16, the daughter of a tramp. She is supposed to have caught the disease at Oswestry.

Burton.—Dr. Thomson says: "In my country district we have been remarkably free from epidemic diseases during the quarter; but in the town of Burton I believe that typhus fever, scarlet fever, and small-pox, have been unusually prevalent."

Oswestry.—Mr. Cartwright says: "Croup for the most part followed the course of the veins, was severe in character, and bore active depletion. Fever of a remittent type had been general, but not fatal, although of a low character, and requiring early support; delirium, in most cases, has set in as early as the third day. An unusually tardy convalescence has been noticed, characterised by excessive sweating, soft and feeble pulse; puerperal cases were disposed to take the epidemic fever and gave much trouble. During the latter part of the quarter several deaths have taken place in subjects debilitated by irregular living; this has been remarkable."

Wrexham.—Dr. Williams writes: "The potato disease has proved most destructive (to that crop) in this neighbourhood. It showed itself earlier than usual; and parties competent to give an opinion, declare that its ravages are more serious than the first year of its appearance. Pleuropneumonia is also very prevalent amongst cattle."

Alford.—Dr. West writes: "The cases of cholera were some in which there were profuse rice-water evacuations, with severe cramps, and arrest of the secretion of urine. In one case, in a stout-built man of 70, a single dose of chalk-mixture having completely stopped the diarrhœa, there followed, first, frequent vomitings of dark green matters; then obstinate constipation, which large and frequent doses of castor oil failed to relieve, but which was finally overcome by a repetition of enemata, the obstruction proving to have depended on a collection of *scybala;* the urinary secretion returning at the same time in great abundance, although catheterism was twice necessary to empty the bladder. The man recovered. In another case in a thin spare old man, of about 70, in whom the cramps were especially violent, a single dose of astringent medicine having stopped the diarrhœa (profuse rice-water), there was the same kind of vomiting; complete arrest of urinary secretion, no possibility of restoring the action of the bowels; catheterism, *after forty-eight hours with no water passed,* pro-

ducing only about half an ounce of urine, and injections bringing nothing away from the bowels. The man died."

Gainsborough.—Dr. Mackinder says: "The vicissitudes of the autumnal season, the removal of the oxygen-eliminating foliage, the superabundance of decaying vegetable matter, and the fluctuations of a lower and less genial thermometrical scale, with the concomitant atmospheric phenomena, prepare us for a considerable amount of sickness and mortality, beyond what was recorded in the summer quarter. The increase of deaths has been chiefly at the two extremes of life—the very old and very young: in the former, from paralysis and thoracic affections; in the latter, from dysentery, bronchitis, and the inanition of unnatural or artificial nursing. We have had a few cases of erysipelas, scarlatina, tic, rheumatism, diarrhœa, and dysentery, more of catarrh, and the diseases of the respiratory organs, while the prevalence of ophthalmic and eruptive affections remind us, touchstone-like, of the past visitation of measles. A few cases of fever, some very mild, others of a more aggravated character, have been sprinkled amongst us. Two of these, which assumed the typhoid form, occurred in a clean, well ventilated house, and for some time caused much perplexity as to their origin. At length, while hunting for an imaginary dead rat, the presumed source of an offensive odour, it was discovered that, in erecting a water-closet in an adjoining dwelling, a hole had been made through a wall under the staircase leading to the dormitory of my patients, thus giving exit to the morbific generator of the disease. In one of our narrowest, ill-ventilated, and most offensive yards, we had at one time one case of scarlet and two of maculated fever; all of which recovered despite the absence of a free current of pure air. The only malady entitled to the epithet epidemic, is that unfortunate importation from France, which is exciting so much attention throughout the country—diphtheritis. I have not heard of a death from it, but have seen many cases,—indeed, nearly the whole of my patients are more or less affected by it. In the majority of instances there is no pain experienced until the disease is fully developed, and consequently it has to be sought for in order to treat it in its primary stages. When first observed, the cases might be mistaken for ordinary faucitis and stomatitis, with occasional enlargement of the tonsils; but, on a narrower inspection, it will be perceived that the inflammatory blush is less vivid, more rubeolous and mottled, more diffused, and less abruptly marginated. If the disease be not arrested at this stage, small points of lymph or lymph-like material are deposited on the inflamed membrane. These

points then seem to enlarge circumferentially, until, in some cases, the fauces, uvula, and soft palate become enveloped. Small patches are also found on the tongue and about the mouth. In some cases excavation of the mucous surface seems to precede the deposition of the new matter; in others, I have not observed any such destruction of tissue until the false membrane has been removed; in most cases the integrity of the surface is preserved throughout. Generally there is a very troublesome cough, often gastro-enteric irritation, and nearly always considerable depression, and sometimes absolute prostration of the vital powers. When I could see the case early, I have thought the free application of the solid nitrate of silver mitigated, and, in several cases, arrested the diphtheritic condition, and the chorate of potassa has been my favourite remedy. Whatever may be the true nature of the disease, whether it be an exudation of organisable or inorganisable material, or the deposition of a parasitic cell, which the microscope may hereafter reveal, it is of an adynamic type, and tolerates, if not, demands, the liberal use of stimulants. Ordinary throat affections take on the diphtheritic condition; and the cases of anginose scarlatina which have been recently under my care, have not escaped the epidemic. Endemically we have little to complain of, except it be an apparently incurable disease which has had a chronic existence in the brains of many of the inhabitants of our court-yards, and for the eradication of which our Board of Health will have to tax its ingenuity. It is a sort of *atmospherophobia*,—a horror of fresh air, a dread of draughts. Here, ensconced within the antique appendages of the four posts, like the presiding guardian of an ebon hue, lingers the poisoned expiration of many a distempered form that I visit; whilst, panting without the casement, yearning for admission, pleads despairingly the health-giving air. When formidable malady is annihilated, and a few other matters of minor importance having been attended to, we shall not have occasion, as far as the health of our town is concerned, to quarrel with any one."

The subjoined meteorological report is furnished by Mr. Dyson:—"During the quarter ending November 30th, the weather has been subject to the usual vicissitudes. The month of September was fine and warm, the temperature twice, on the 7th and 17th, having reached 79°. Rain fell on twelve days, and the amount collected was 2.47 inches. The hottest day in October was the 1st, the temperature being 73°. Dense fogs and drizzling rain prevailed from the 12th to the 27th. The amount of rain was 1.7 inch. Dense fogs and mild tem-

perature characterised nearly the whole of November till the 25th, when the temperature suddenly fell in the night to 26°, or 6° below the point of freezing. Rain fell on sixteen days, and the amount 1.12 inch. The total amount of rain in the quarter was 5.39 inches on 45 days. There was a free development of ozone during nearly the whole of September and October; partial in November; on the first four days, and from the 14th to the 22nd. The range of temperature between the 23rd and 25th of November, in 36 hours, was from 52° to 26°, or a difference of 26°. Coughs and sore throats immediately succeeded this sudden change from mild, insinuating, and relaxing weather, to the extreme of winter cold. A severe frost set in on the 28th, but lasted only one day; the wind suddenly changed on the 29th, and the temperature rose 12° in that number of hours."

Liverpool.—During the quarter ending on September 20th, 3,428 deaths were registered in the borough, including 189 sudden and violent deaths, and deaths in the hospitals. This number was 410 more than the corresponding quarter of last year, and 70 more than the corrected average of the same quarter of the preceding nine years, excluding epidemic cholera. The deaths from zymotic diseases during the quarter were 1,289, being 115 more than the corrected average without cholera. From diarrhœa the deaths were 618, nearly one-half of the entire number, the average being 405. From hooping-cough the deaths were 190; from scarlatina, 179; fever, 107; small-pox 43 (of which 12 were after vaccination); dysentery, 33; cholera, 33; croup, 16; measles, 16; syphilis, 10. The only diseases of this class more prevalent than usual besides diarrhœa were hooping-cough and scarlatina, the latter of which still showed a disposition to spread. From hooping-cough the deaths during the last five quarters had been successively 55, 65, 100, 158, 190; but the disease appeared to have reached the maximum for the present. The mortality from croup was lower than in any quarter except that immediately preceding; and that of measles lower than in any, with the exception of the quarter immediately preceding. Diseases of the lungs, including 358 from consumption, had caused 644 deaths, being 30 less than the average.

For the deaths in each week, and the meteorological returns, see the opposite table.

Wigan.—Mr. Hussey writes: "Catarrh (or influenza) of a mild character generally, has prevailed much since the cold winds set in. Diarrhœa, of a most severe character, with cramps in many instances, has been the order of the past quarter. In

MORTALITY AND METEOROLOGY OF LIVERPOOL.

Deaths. Week ending	September. 5th.	12th.	19th.	26th.	October. 3rd.	10th.	17th.	24th.	31st.	November. 7th.	14th.	21st.	28th.
Scarlet fever	14	16	15	30	26	21	30	..	..	..	..	33	25
Measles	2	1	1	2	2	2	2	..	..	..	..	..	..
Small-pox	1	4	3	5	3	2	2	..	..	..	..	..	4
Hooping cough	16	12	8	15	12	21	15	..	..	..	..	..	11
Croup	..	..	1	2	1	2	..	..	..	..	..	..	2
Cholera	2	1	3	36	24	..	1	..	..	..	..	..	..
Diarrhœa*	73	50	47	36	3	20	13	..	..	..	..	..	2
Typhus	14	9	12	13	14	17	10	..	..	..	..	..	17
Disease of lungs	34	45	39	47	44	62	59	..	..	..	..	100	103
Purpura	..	..	1	..	..	..	3	..	..	..	..	..	..
Intemperance	..	1	2	..	..	..	..	..	..	..	..	..	1
Syphilis	2	..	1	1	..	1	..	..	..	..	..	..	..
Total deaths during each week	272	272	237	250	232	235	254	278	261	316	352	..	266
Corresponding week, 1856	..	..	..	240	192	185	203	..	..	..	..	192	209
METEOROLOGICAL OBSERVATIONS.													
Barometer: Mean	29·79	29·69	30·19	30·10	29·98	29·50	30·03	29·90	29·88	29·92	30·54	30·28	..
Dew-point temperature	54·6	56·5	59·5	51·9	53·5	47·3	54·1	47·5	47·8	48·4	45·5	44·4	..
Thermometer: Highest (mean)	67·1	65·5	69·4	64·1	64·3	57·7	62·2	58·3	57·0	54·8	52·0	53·5	..
Lowest (mean)	55·7	56·5	58·3	53·5	55·5	48·9	53·5	49·6	48·6	47·7	44·5	46·2	..
Mean	61·4	61·0	63·8	58·8	59·9	53·3	57·8	54·0	52·8	51·3	48·3	49·8	..
Mean of 11 years	60·3	58·8	57·5	57·0	55·1	53·1	51·4	51·7	49·0	49·0	46·6	44·9	..
Range	11·4	9·0	11·2	10·5	8·7	8.9	8·7	8·8	8·4	7·1	7·5	7·4	..
Mean range, 11 years	10·3	10·9	10·1	9·3	8·6	8·1	8·4	7·6	7·7	7·2	6·8	6·4	..
Rain fell on days	4	3	1	2	3	6	1	4	3	4	0	2	..
Rain fell during hours	11·7	1	2	1·9	12	16·7	1·4	6	7·5	27·2	0	7	..
Amount of rain in inches	0·71	1·39	0·04	0·08	0·80	1·27	0·02	0·32	0·24	0·81	0	0·26	..
General direction of wind	N.	var.	SE.	SE.	SW.	var.	S.	N. E.	SE.	SE. E.	S. SE.	S. SE.	..

* Of the 73 deaths from diarrhœa, noted on September 5th, 60 were in infants. Of the 50 deaths, noted September 12th, 44 were in children; two only in persons between 4 and 76 years; and four in men aged respectively 76, 83, 92, and 97. Of the 47, noted September 19th, 42 were in children under 2 years of age. Of the 36, noted September 26th, 34 were in children.

Wigan, I have been informed by Mr. Winnard, smallpox has been very rife, and what is remarkable is, that in the *confluent form the patients have gone about the house comparatively free from constitutional symptoms or complications.* In badly drained districts typhus seems to linger on, but typhoid fever has been more general. Children of the poor and middle classes have of late suffered much from bronchitis with diarrhœa, and, in a few cases, mild dysentery. In my pauper practice, I have no epidemic cases, notwithstanding the cold weather and bad times, and in the workhouse we have nothing of any note—nor for three months past. The smallpox in Wigan has prevailed much amongst adults, a fact which in England calls loudly for revaccination, as is the practice in America. November was our coldest month; there was little or no rain."

Bolton-le-Moors.—Mr. Pendlebury says: "There has been a considerable amount of sickness during the past quarter; in the latter half of which there has arisen a rather fierce epidemic of influenza. Bronchial affections have been very prevalent, especially in children, amongst whom there was scarcely ever known to have been a greater mortality. Several cases of the disease, lately noticed in the county of Essex, have been observed, but of a milder form. At the onset, three cases resembled ordinary quinsy, accompanied with great debility, lassitude, and general *malaise;* but the tonsils (on the second or third day), instead of suppuration, exhibited superficial brown sloughy patches. The lunar caustic, with mineral acids and quinine, generally effected a cure. Typhus has not so generally prevailed in the town as in the country. A few cases only of small-pox have appeared. The other exanthemata have been ordinarily rife. The autumnal season was never known to have been finer, or more suitable for agricultural purposes. The winds have almost constantly held to the E. and S.E., with an unusually small quantity of rain. Cases of rheumatism, and especially of the acute variety, have been quite the exception this quarter. I have been informed that, in some of the colliery districts, wounds from accidents have had a great tendency to an unhealthy action; many cases simulating hospital gangrene."

Bramley—Mr. Radcliffe says: "Epidemics, catarrh (coryza) were prevalent during the weeks ending Nov. 6th, 13th, 20th, and 27th, but the cases were not of sufficient severity to require medical interference. Well marked cases of influenza occurred during the weeks ending November 20th and 27th (during the same period influenza was very prevalent in the neighbouring town of Leeds); common continued fever was rife during the weeks

ending 13th, 20th, and 27th. The majority of the cases of fever were complicated with bronchitis. No case of epizootic pleuropneumonia among horned cattle, or of any other epizootic affection, has come to my knowledge in the township during the past quarter. From one-third to two-thirds of the different crops of the potatoes in the township have been destroyed by the potato-disease."

York.—Mr. Procter writes: "October and November were in this place generally unhealthy, but the diseases were not fatal except in the aged. Small-pox prevails extensively. The cases of scarlatina have been numerous, not fatal, but usually with more or less throat affection and a prolonged convalescence. The influenza in its very general, almost, it may be said, universal attacks, has been very frequently accompanied by a low typhoid fever and in some cases by pneumonia."

Rothbury.—Mr. Summers says: "The cases of typhus were not numerous, but some of them were very severe. Two fatal cases were children of ten or twelve years of age, both residing in places surrounded by filth, &c. In one case an open drain runs close along the back wall of the house, receiving the filth of several houses, and of a butcher's slaughter-house. The house is besides surrounded by dungheaps and stables. In the other case, there existed a choked up drain on the premises, to the danger of which the tenant's attention had been drawn only a short time before the occurrence of the fever."

Lerwick.—Dr. Spence says: "The fine weather mentioned as prevailing during last quarter continued during September and October, these months being finer and more equable than usual: but a sudden change took place about the beginning of November, when the weather became cold, wet, and stormy. The indications of ozone were greatest in the beginning of September and the end of November, and least in the middle of October. It appeared to me that when ozone was deficient diarrhœa was common, and when it was above the average, catarrhs were prevalent. Influenza was pretty common in the last week of the quarter, during which the indications of ozone were higher than at any other period since I commenced my observations. Diarrhœa was of much more frequent occurrence than in ordinary seasons; many of the cases, especially during the week ending 16th October, very severe, and attended with vomiting and cramps. I have separated the cases of common continued fever and typhoid fever, or dothinenterite, from typhus, to avoid what I look on as a grave error in epidemiology. The case of typhoid occurred in a young man who had returned from the Davis's Straits whale-fishery by way of Peterhead,

and who was feeling unwell when he landed in Lerwick. The total number of deaths from all causes was eighteen, of which eight occurred in November; the average age was forty-seven, there being three below five, and five above seventy. The causes in those cases in which medical certificates were furnished were, dysentery, one; typhoid fever, one; pneumonia, one; cerebral disease, one; acute hydrocephalus, one; infantile convulsions, one; cardiac disease, two; chronic bronchitis, one; cancer of lung, one; chronic hepatitis, one; malignant ulcer of leg, one; and irritative fever caused by the prick of a rusty nail, one."

SANITARY LEGISLATION.

Reports on "Metropolitan Drainage," on the "River Thames," and "Metropolitan Improvements," lie before us. In the first report, which is the only one to which we need refer, the question of the utilisation of sewage is dismissed as too theoretical to be at present entertained by the Metropolitan Board of Works. The reporters, Messrs. Galton, Simpson, and Blackwell, are of opinion that the only practicable mode of disposing of the sewage is to provide for its rapid removal from inhabited districts, and for its collection in main outfalls, where private enterprise may be at liberty to utilise it; and that the best outfall for the north side of the metropolis is a place between Mucking Lighthouse and Thames Haven; and on the south side, Higham Creek, in the Lower Hope. They dwell on the increasing pollution of water streams throughout the country as an evil consequent on improved house-drainage, and suggest the necessity of attention to this all-important fact. With respect to the general question of the purification of the Thames, it is quite evident, say the reporters, that a large tidal navigable river passing through a country thickly inhabited must be polluted to a certain extent, from the refuse of ships, barges, and the like; but this contamination might, they think, be prevented in great part if the conservators of the river were invested with more power for protecting the river from being polluted. Reviewing all that is argued in this report, we opine that the plan for the grand scheme of London drainage proposed in the report, is the best yet offered of the kind; but we still think that it is not *the* plan, and that neither the plan nor the planner of this great national undertaking has as yet appeared.

TRANSACTIONS

OF THE

EPIDEMIOLOGICAL SOCIETY

OF LONDON

FOR THE YEAR 1857.

LONDON:
T. RICHARDS, 37, GREAT QUEEN STREET

M.DCCC.LVII.

INDEX.

Babington, Dr. B. G., introductory address, 73

Cholera in the island of Fogo, 41

Climate of the Crimea, Dr. Smart on, 1

Epidemic diseases, Dr. Greenhow on study of, 77

Epidemiological Society, quarterly reports of proceedings, 24, 39, 72

Eruptive fevers, Dr. Tripe on mortality from, 25

Gaol fever, Dr. Webb's historical account of, 63

Greenhow, Dr. E. H., study of epidemic diseases, 77

Introductory address by Dr. Babington, 73

Leaõ, J. F. da Silva, cholera in the island of Fogo, 41

Smart, Dr. W. E., climate of the Crimea, 1

Tripe, Dr. J. W., mortality from eruptive fevers, 25

Webb, Dr. F. C., historical account of gaol fever, 63

NOTES AND CORRESPONDENCE.

THE Editor is anxious to give free scope to the expression of opinion, but does not hold himself responsible for the opinions of those of his contributors who attach their names to their papers.

THE QUEEN'S HOSPITAL, BIRMINGHAM.—We have received many communications on the subject of the controversy now going on regarding the election of surgeon to this Hospital. Mr. Joseph Sampson Gamgee competed for this appointment, and on the ground of pure merit obtained it by the conscientious voice of the Professors of the Queen's College. Against this sterling recognition of simple scientific claims, ignorance—there is no other word which expresses the fact—backed up by a fair amount of jealous selfishness, has raised its churlish, idiot, grinning face. We are not much concerned with surgical disputes; and, as our readers know, we often cross a lance with Mr. Gamgee. But we can afford to give to a friendly rival his due meed of honour, and to say for him that, as in these days the Hygiene of hospitals is a matter of far greater moment than any amount of skilful flesh-hewing or blood-drawing, so could the two great secrets of surgical success, hygienic principles and operative skill, be entrusted to no more able or energetic man than Mr. Gamgee. Moreover, as the advocates of right against might, we are bound to his cause, and believe and hope that the common sense of the Birmingham folk will ultimately settle the question in favour of knowledge, justice, and liberality. Otherwise, what shall we close-borough Londoners think of Birmingham talk about progress, and all that drug-in-the-market verbiage?

Apropos to this controversy, it recalls to our mind an incident, showing at one and the same time an analogy and a difference between Metropolitan and Provincial tactics. A medical appointment was open for competition a few years since in our town. The electors had insecurely, or rather hastily, pronounced that there should be no favour, that merit should rule the day. There were many competitors, but ultimately the choice rested on two or three. One candidate, by testimonials and amount of labour in the department, stood the acknowledged first on such estimate; one or two other candidates stood first on local influence grounds. What must the council do in this dilemma? Refer the matter to a committee? Certainly. The committee met; it laid no claim to sapiency, but to a great amount of decision. A straightforward John Bull tradesman opened the debate. "Mr Chairman, don't let us go to the thing like a lot of humbugs—let's be honest, and satisfy everybody. Honesty is the best policy, sir. There's no doubt that Leydenjar, with the long titles and testimonials, is the best man, and knows as much about the duties as any man can; but we want somebody else, isn't that the fact (hear, hear). Well then, if we want somebody else, let's have him (cheers); and this is the resolution I have to propose:—'Your committee is of opinion, that as the parish is very small, there can be no necessity for a scientific officer: they think an ordinary practitioner will answer every purpose.'" It is the fact that this resolution, accurate in essence if not in the exact words, ruled the election, and this so admirably, that when the exploded Leydenjar met his successful rival, they shook hands as friendly as ever. The one

was tacitly satisfied with the compliment to his science, the other with the compliment to his pocket and local reputation, while many a hearty laugh did the proceedings excite amongst the science men about town. To the progressive and knowledge loving people of Birmingham as a whole, we would be abashed to offer such a Metropolitan incident as a pattern, although, to such few of them as "for a pretence make long prayers," it deserves recommendation, as being at least innocent, straightforward, and honest.

We abstain, according to our custom, from entering into any personalities on this topic, except in so far as this is personal;—that we hold in the profoundest admiration the enlightened and manly conduct of certain gentlemen, with whom we are equally unacquainted, viz.: the Reverend Chancellor Law, Mr. Sands Cox, Dr. Birt Davies, and the other Professors. In every sense, these are gentlemen of Birmingham, and of England.

The Editor has once more the pleasure of returning his warmest thanks to his learned coadjutors for the ready support which they have rendered, and which enables him to add another volume to the SANITARY LITERATURE of Great Britain.

M. BAUDENS. We regret much to have to announce the untimely death of our learned and distinguished brother, M. Baudens, Physician General of the French army, and Author of the "Medical Mission to the army of the East."

Dr. RICHARDSON would be obliged if correspondents would kindly address their papers and books for review to his private residence, 12, Hinde Street, Manchester Square, W.

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RADCLIFFE (J. N.) The Hygiene of the Turkish Army. From the Sanitary Review. London: Churchill 1858.

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TRANSACTIONS

OF THE

EPIDEMIOLOGICAL SOCIETY OF LONDON.

Papers and Communications.

A SKETCH OF THE PRINCIPAL FEATURES OF THE CLIMATE OF THE CRIMEA, AND ITS EFFECTS ON HEALTH, AS OBSERVED DURING THE FIRST YEAR OF THE OCCUPATION BY THE ALLIED FORCES.

By WILLIAM R. E. SMART, M.D., H.M.S. *Diamond;* late Surgeon in charge of the Naval Brigade Hospital.

THE following sketch of the nature and peculiarities of the Crimean climate, and of its more obvious effects on health, is not offered with the same amount of confidence as belongs to remarks founded on a complete series of observations, made with accurate scientific instruments.

It professes to be simply an arrangement of casual rough notes, made in a journal, during the pressure of most important duties of a strictly professional character; and, as the writer has not met with any connected and familiar account of the phenomena of the Crimean climate, he imagines that, presented in this form, the matter may be of passing interest, if not sufficiently profound to be of scientific utility.

In the earliest passages of European history, Cimmeria, now the Crimea, was fabled to be a land involved in perpetual mists and darkness, and its inhabitants were said to be addicted to the most barbarous practices, and so inhospitable that they sacrificed all strangers to a relentless female deity.

At length some Ionian adventurers, undaunted by these

fables, or by the general belief of the innavigable nature of the intervening sea, pushed boldly across, and reached a sunny shore with far receding fertile plains. Here they founded the city—Panticapæum—that exists to this day under the name of Kertch; which, owing to the excellence of its commercial position, arose from being the humble tributary of barbarous tribes, to the dignity of the seat of a kingdom; and has since been in succession a dependency of the Pontine, Roman, Byzantine, Ottoman, and Russian empires.

From the date of the Ionian visit, 650 B.C., commerce began to carry civilisation on her wings to the remoter parts of Scythia, and to return laden with the native productions of those vast plains and interminable forests.

In order to encourage intercourse, these first adventurers changed the name of the sea, from that which signified inhospitable, to Εὔξεινος, the hospitable; an idea that was again acted on with similar results, after the lapse of 2,300 years, when the "Cape of Tempests", from which the first expedition had turned back in despair, received the more propitious name of "Good Hope".

The terrors arising from ignorance being thus dispelled, the argosies of Greece sailed over the Euxine in safety; and the merchants of Athens in her brightest days, at their meetings under the porticos of the Agora, calculated on the returning season of the north-east wind, that should bring into their ports of Munychia and Phalerum the cargoes of corn that had waved on Cimmerian plains, of salted flesh of the sturgeon caught in the waters of the Tanais and the Rha, and of the skins and costly furs of wild animals, ensnared on the slopes of Hyperborean mountains, or far off in the unknown wilds of Northern Asia.

The importance of this commerce increased with the growth of the Byzantine empire; but, when the Eastern mistress of the world became the metropolis of the Ottoman empire, Cimmerian darkness again enshrouded these favoured regions, and thus the ancient fables concerning them have been almost equalled in modern days.

Before the massacre of Sinope had stained the waters of the Euxine with blood, our fleet lay in the Thracian Bosphorus, hesitating to enter a sea of which the pilotage was unknown, presuming it to be studded with undiscovered shoals, and obscured by fogs and by clouds pregnant with storms. Two years have sufficed to dispel such delusions; and Western Europe remains no longer in ignorance of these among the fairest regions of the earth, the borders of that

great basin, into which the largest rivers of Europe pour their inexhaustible floods.

The labours and the triumphs of war have conduced, in this instance, to the extension of the arts of peace. Our pilots now navigate fearlessly the farthest recesses of this sea, knowing that its broad bosom is free from hidden dangers. Our merchants have become more fully acquainted with the resources of the fertile provinces extending from its shores, which, when fully developed, will render it an almost unequalled emporium for the supply of less productive regions, opening up, at the same time, a wide field for the spread of our commerce and manufactures.

The ambitious disturber has been taught how futile it is to direct her energies to the fulfilment of dreams of conquest in this direction, and has been led to change her aim to the peaceful development of the riches of her soil, and to the establishment of her great commercial interests, as the only sure mode of increasing her influence among the surrounding states.

This general good has been attained at the cost of legions, of which Britain was justly proud, whose sufferings have been wrongly attributed, in great measure, to the nature of the climate in which they were called on to undergo military labours with numbers inadequate to their task. Enfeebled by epidemic disease, they were landed in the Crimea, when winter was close at hand, to fight a skilful and unwearied enemy; and, after conquering in the field, to restrain within his fortifications this foe, possessing unlimited resources, and the advantages of winter quarters, while they themselves lay encamped in the open field, suffering the worst evils of poverty. Calamities beyond calculation naturally followed; and these may have been somewhat increased by rigors of the climate.

To assist in ascertaining how much of the disease that prevailed among our soldiers is fairly attributable to the conditions of climate in which they were placed, is the main object of these observations.

The Crimea being almost surrounded by water, and connected by means of a narrow short isthmus with a vast extent of flat country, possesses, from its conformation and contiguity, a climate that partakes of both those groups of characteristics that are contradistinguished by the terms *continental* and *insular*. These opposite characters do not, however, impress their traits continuously, so as to mark each its own seasons of the year; but, by their frequent alternations, they serve rather to stamp the climate as an

irregular and inconstant one, from which it may be anticipated that the advent and course of the seasons will be found to vary much in succeeding years.

In specifying briefly the leading features of the seasons, through the first year of the occupation by the allies, and taking each season in succession, it may be said of the winter, that its mean temperature was mild, with much moisture deposited in the early part of it, to the end of December; after which there were heavy falls of snow, with low depression of the thermometer, continuous through a space of three weeks. This, which may be regarded as the climax of the winter, occurred early in January; and, in receding or in advancing from that point, there was not found any long duration of cold.

A most striking peculiarity of the winter, was the suddenness of accession of great variations of temperature, by which both animal and vegetable life were submitted with rapidity to the accelerating and reproductive influences that more properly belong to the spring, and were again acted on by the retarding influences of the depth of winter; very marked changes of this kind being completed in the course of a few hours. These were simply the interchanges of the continental and insular conditions of climate, which were felt extremely in the position occupied by the allies—the Chersonese—because the mountain barrier that shelters from the northern influences does not extend so far west.

As early as the middle of February, sometimes at noon the thermometer was observed to have risen to above 70°; the galanthus and crocus, the first offerings of a grateful soil, were seen thus early bedecking every bank; and a little later, numerous varieties of bulbous and orchidaceous plants were in flower.

The spring season, from the early part of March to the end of April, was warm; and the ground was moistened by showers that fell frequently in the day, the nights being clear, cold, and dewy. The invigorating effect of this season on the animal kingdom, was strongly exemplified in the large flights of migratory birds that tarried on these shores in their course to northern fields, in the improving condition of those domestic animals that had withstood the vicissitudes of the winter, and in the joyful spirit pervading the camp, exhibited in the early institution of athletic sports, which had been, in January, as far from the ideas of the men, as they were foreign to the circumstances of their condition.

The heat of the summer was at no time excessive, not

equal to that to which our troops are accustomed when stationed at Gibraltar or Malta; but in May and June it was oppressive, from the extreme dryness of the atmosphere, with northerly winds, which absorbed every particle of moisture, and gave very few showers in return. This dry heat was much complained of, because of the great evaporation that went on from the surface of the body while it lasted, but it did not appear unhealthy; it quickened the breathing and accelerated the circulation, and was by no means prohibitive of exercise to the healthy, while it seemed not to retard the convalescence of the sick. During its continuance, at this early season, the atmosphere was clear and highly rarefied; distant objects were distinctly visible; the thermometer betrayed no unusual elevation; and the difference of the wet and dry bulbs was uniformly great.

This was the period of longest continued drought; but when the sun had reached his highest, and when, if the same conditions had increased, disease might have shewn itself among animals, and barrenness would have affected the parched soil, thunderstorms began to occur, and they were repeated at moderate intervals until the end of September. By these a more pleasant atmosphere was restored to the air, impurities were cleansed away from the surface of the ground, and the almost exhausted water sources were replenished. The summer nights were almost constantly rendered cool by moderate winds; and thus there were rarely felt that exhaustion of physical power, and that depression of animal spirits, which arise from the opposite conditions, and preclude the restorative effects of sleep.

The character of the produce of a land, and the earlier or later date of its harvests, are very general, but withal good, criteria of the average conditions of its climate. To apply this, it may be stated, that on first arriving on these shores in the middle of September 1854, it appeared significant of a moderate mean temperature of the summer, that the cereals had just then been reaped, and were but partially gathered in, while the grape was not yet ripe for the vintage; and the absence of the olive afforded evidence, that the production of oil from it does not enter into the profitable agricultural resources of a country where much of that commodity is in demand.

These facts alone would lead to one of two inferences: either that the summer of 1854 was behind the average of years, or that the climate of the south-western portion of the Crimea, in its main features and mean temperature, resem-

bles more closely that of Belgium and the south of England, that lie five degrees north of it, on the western or oceanic confine of Europe, than the plains of Lombardy and Central France, which are situated within its own parallels.

The summer season changed imperceptibly into that of autumn; and, regarding that season as a whole, I have not known any country in which the climate is found more agreeable to the sensations. An unfailing succession of cool nights to warm clear days marked the course of the season to the end of October, when the north wind, blowing coldly at intervals, began to suggest a return to the comforts of winter garments.

The change from autumn to winter, in 1854, was as sudden as that from winter to spring; and depressed even more than the latter exhilarated, rather from continued rains, than from intense cold, attending it.

The sudden mutations of temperature to which the climate of the Crimea is liable in the winter months, were more hurtful to the health of our forces than any other of the climatic conditions. These changes of heat and cold were the sequences of the shiftings of the winds from the northerly to the southerly direction, or *vice versâ*. They were of such extreme nature as to produce a fall of 30° in the thermometer within a few hours; and even then this instrument, which is moved simply by the dynamic laws of matter, was but a feeble indicator in comparison with the sensibility of the nervous organisations of man, and of animals in general. Fortunately, the stages of very low temperature were usually of relatively short duration; but the change in the opposite direction being effected with equal rapidity, it was often found to cause injurious effects on health. The changes from high to low temperature most frequently took place in the hours of the night, while those from cold to heat very generally occurred in the day time; the former being often attended with a fall of snow, and the latter by that of rain or hail.

I have said that these great vicissitudes of temperature of the winter season, together with the frequent electric changes of the summer, are dependent on the alternations of the two principal winds, or rather on the changes of relative altitude and position of the planes of these atmospheric currents, determined by the mixed continental and insular conditions of the land; and that the configuration of its surface has a strong local influence. High mountains range along its southern coasts, and form a lofty boundary, which causes the insular conditions of climate to predominate south of its barrier over

that narrow strip of coast, which resembles in its scenery, as well as in its climate, the Italian "riviera" between Nice and Genoa. To this shore the imperial family and the nobility resort, to enjoy the balmy influences of a southern clime, in villas seated amid the soft seclusion of luxuriant valleys that terminate deep ravines, or on the sunny aspects of mountain slopes that decline rapidly towards the azure depths of the sea. Northward of the mountain ridge, the whole aspect of the country and its climate, except in a few sheltered vales, is assimilated to the continental conditions of South Russia; the mountains reach the low level by graduated slopes, with but few precipices, and from their foot wide plains of a gravelly soil and clayey subsoil, productive of a scanty pasturage and of fair crops of corn, extend as far as the eye can reach. The deep river beds, with their precipitous newly cut banks, exposing loops of the bared roots of shrubs, speak plainly of the winter torrent that rushes along the channel, which, in summer, is almost dry. In summer, these treeless plains are parched by the direct rays of the sun, and a wavering glare floats over their surface; in the winter, they are sodden with the early rains, and swept across by frozen blasts from the north, and then their inhospitable surface offers none but artificial shelter to the shepherd and his flocks.

The flanks of the mountain range, of which the western was the seat of war, are obnoxious to all the inconveniences of the alternations of these opposite conditions.

I have shown, or attempted to show, in the foregoing general remarks on the seasons, in what manner the continental and insular conditions interchange with each other, to generate the remarkable instability of the climate of the Crimean Chersonese, and its obnoxiousness to sudden extreme variations in the colder half of the year. Consideration must, in the next place, be extended to the more obvious phenomena that characterise the different seasons, so as to arrive at and to explain, if possible, whatever is unusual in them.

This branch of the subject will embrace the phenomena of—

1. Atmospheric currents or winds.
2. Marine currents, or streams of sea and river water.
3. Atmospheric moisture, the varying degree of capacity for its suspension, and its forms of deposit, as influenced by the above phenomena.
4. Electric disturbance, as thunderstorms, etc.

1. *Atmospheric Currents.* As a general fact, it may be stated that the northerly current prevailed at the surface of the earth during the summer months, and that from the south

through the winter; although it must be understood there were frequent interruptions in each season. By this general disposition, however, the mean temperature was greatly influenced; the north wind being in the summer season a dry warm wind in the day time, and cool and refreshing at night, but in the winter it was the cold blast; and thus it produced both extremes of temperature—the heat of summer, and the winter's cold.

The northern current, having traversed the bare plains of Southern Russia and the Crimea, varies with the season of the year, as above described: the other, coming from the warmer regions of the south, across a wide expanse of sea, is always mild and saturated with moisture; it produces an equable temperature, and the clouds it brings, being attracted by the high range of coast mountains, deposit their contents in the form of rain in summer and early winter, and of hail or snow later in that season.

The direction of the winds was the most uncertain and variable at the rainy seasons that ushered in the winter and spring. The great northerly and southerly currents were then contending, as it were, for the mastery of the approaching season, by occupation of the plane nearest the earth's surface; and it was then, especially at the commencement of winter, that violent gales of wind occurred. That of the 14th of November, 1854, followed the contour of the coast; it swept from east to west, and then from south to north, following the coast line. Its disastrous effects were first felt at the anchorage of Balaklava, then at Kamiesch, the Katscha river, Eupatoria, and Cape Tarkan, in succession, revolving from south-east to west, and then towards the north point of the compass; the wind striking in a different direction at each of the above points of its course.

In the winter months, the alteration of direction from the south to the north usually took place in the night hours, and was often attended by a fall of snow; while the alteration in the opposite direction took place in the day, and was frequently accompanied by rain or hail.

Through the summer there was a pretty regular succession of land and sea breezes on the coast; the former setting in between 10 P.M. and midnight, and lasting until after sunrise, often until 7 A.M. The distant ripple of the sea that announced the approach of the latter was usually seen, like a dark blue line on the horizon, early in the forenoon; the gentle breeze usually reached the shore before midday, to die gradually away with the setting of the sun.

These phenomena were dependent on the diurnal variations in the heat of the earth and of the sea; the former undergoing changes, while the latter preserved its uniformity.

2. *Currents of Sea and River Waters.* The Euxine must be regarded as a broad, deep, inland depression, receiving at one of its ends the streams of numerous great rivers which, flowing from the north, pour into it a volume of water that varies in quantity at different seasons, and also in temperature, in accordance with the greater or less quantity of melted ice and snow that enters into their streams. The surface of land that drains its waters into this basin, extends from the northern slopes of the Caucasus to the eastern precipices of the Swiss Alps, and from the Balkan and the Dalmatian Alps in the south, to the hills of moderate height that form the northern boundary of the great central plain of Russia. The mass of water received from this great water-shed, is more than sufficient to compensate the undoubtedly great evaporation constantly going on from the surface of the Euxine; and the surplus waters find an outlet to the southward by the Bosphorus, through which there is usually an outward stream. As the supply from the rivers is greatest in the spring and early summer, so the marine currents are strongest then.

By inspection of an ordinary chart of the surrounding provinces, it will be seen that the water flowing from the central plains of Russia through the straits of Kertch and the Dnieperliman, is thrown to the westward by the direction of the river channels. Thus, the stream of the Don courses along the south coast of the Crimea, and strikes across to the coast of Bulgaria, south of the mouths of the Danube. The water of the Dnieper and the Boug is directed at once towards the western shore; it meets with the streams of the Dniester and Danube, and deflects them along the coast of Bulgaria, where the conjoined current is further increased by that from the Don. The entire body of water proceeding along the southern shore, a lateral portion of it escapes through the Bosphorus; while the great mass, still proceeding eastward along the coast of Anatolia, and then north-west by that of Circassia, arrives off the straits of Kertch, where it begins again to receive the fresh outpourings of the northern rivers.

It is important to observe that, in this wide circulation, the temperature of the sea must be raised by contact with the southern shores, and by the influx of the rivers from the south; and that, when this current meets with the river streams from the north, which are of lower temperature than

itself, the admixture is attended with abstraction of sensible heat from the atmosphere, and the condensation of its vapour commences, which, under certain circumstances, proceeds until *sea-fogs* are formed, and hang over the surface of the mingling currents.

3. *Atmospheric Moisture.* The Crimea being of almost insular form, surrounded by waters of a rather elevated temperature, it follows that its atmosphere must contain a more than average amount of moisture, from the evaporation that is constantly going on from the sea-surface. It may be said, that the warm current of water from the south is the grand source of atmospheric moisture; and, as the capacity for vapour of the atmosphere is increased by heat, the currents of air, that accompany the marine current from the south, must have a higher capacity for it than the cooler northerly currents. This was well exemplified in the early winter—in November and December, when the relative heat of the marine current is at its highest, as there is then the smallest admixture of snow or ice water poured in by the rivers, and the south winds reach the shores, laden with moisture, to meet with the northerly currents of air that have passed over a surface of land of falling temperature; and under these circumstances there occur the only truly periodical and continued rains of the climate. Later in the winter season, when the south winds meet with the now much colder northerly currents, the precipitated moisture assumes the form of snow, small showers of which were not infrequent at night in December; but until January and February there were no falls of snow so heavy as to lie on the ground beyond a day or two.

The rains of the spring season were more temporary than those of the early winter; they rarely occupied more than a portion of the day, occurring most frequently in the forenoon; and they were seldom the product of a densely overcast sky. It was frequently noticed at this season, that local showers fell, with light southerly winds, in the hottest part of the day, while great evaporation was going on from the surface of the earth, as indicated by the wide difference of temperature of the two dry and wetted bulbs. These coincidences, at first sight somewhat paradoxical, simply showed that, the southerly current being inferior to the northerly one during the day hours, there was a decreasing capacity for vapour in its upper plane from contact with the cooler north current, simultaneously with an increasing capacity of the lower plane, caused by heat radiated from the earth's surface. From these coexisting conditions, the upper plane was con-

densing vapour, of which it was receiving constant additions from the ascending currents of heated air, that bore away the great evaporation from the soil, absorbed by the atmosphere nearest to its surface.

The meeting of those two main currents of air of different temperatures is certainly the prime cause of the precipitation of the atmospheric vapour in the form of rain, snow, or hail; and thus the majority of the phenomena of moisture, that occur in the colder half of the year, without any great electric disturbance, can be readily enough accounted for. But the existence of a lofty range of mountains, parallel to and not far from the southern coast, has a considerable influence on these phenomena; this influence being of greatest extent in the summer season, when the falls of rain were most frequently in thunder storms with much electric disturbance.

There are some other phenomena of moisture, such as dew and fogs, that arise from a somewhat different train of causes, and require a separate consideration. In as far as they are limited to the land, they are dependent on the diurnal variations of terrestrial heat, on the inequalities between this and that of the atmosphere, and on the clearness of the sky from clouds; while, in the formation of sea-fogs, the marine currents cooperate with those of the atmosphere, to effect condensation of vapour, by similar means of variations of temperature.

In explanation of the *dew and fogs of the land*, it must be repeated that the main supply of vapour is that brought to these shores by the south winds. Now, the capacity of the atmosphere for vapour preserves a certain uniformity as long as it is carried across the sea, of which the temperature, under ordinary circumstances, is slow to change; but, when by the onward course of the wind, it is brought into relation with the surface of the earth that undergoes great diurnal variations of heat, the capacity for vapour of the superincumbent air, and the elasticity of the vapour itself, undergo corresponding stages of increase and diminution.

From these causes it happens that, in the hot days and cool nights of spring and autumn, when south winds blow during the day and north winds during the night, as the land becomes much heated in the day, so the air becomes loaded with insensible moisture; and, as the earth's surface is cooled again at night by the passage of the northerly current, and by free radiation into the clear sky which attends it, the atmosphere then deposits its excess of vapour in the form of dew on the surface of the land, of

which the temperature has been reduced below its own. In summer this process of deposit is usually restricted to the after-midnight hours, because, during the long day, the earth has absorbed much heat, to radiate which occupies a great portion of the short night; but, as the cooler season advances, it commences earlier, and thus heavy dews, almost approaching to rain in saturating effect, were observed in April and May, and again in September and October, because, from the more rapid cooling of the earth, the period of deposit then extends almost from sunset to sunrise.

As the season approximates more closely to that of greatest cold, the same conditions existing during the day, the atmospheric vapour is equally great in quantity; and, as the air becomes very cold at night, its capacity for vapour, and the elasticity of the vapour itself, are both greatly reduced; and it is then abundantly condensed into watery particles, that remain suspended in the air in the form of fog, because, the surface of the earth not having undergone an equal amount of cooling with the air, the deposit on its surface in the form of dew cannot be effected. Under these conditions, the suspended particles subside into the depressions of the earth's surface, to form fogs there, which dissolve and concentrate the emanations arising from the warmer soil. These deleterious agencies disappear under causes that restore a relatively higher temperature to the air over that of the earth; thus, by a change to a warmer wind at night, they may be deposited as dew; or they are dissipated in the morning, as fleecy clouds amid the ascending currents of air, or as a sheet rolled off to seaward, as the sun's rays acquire calefacient force. As this phenomenon depends on the soil possessing a higher relative temperature than the air, it follows that fogs are densest and of most frequent occurrence at the decline of the year, when the earth has not yet radiated all the superficial heat accumulated by absorption during the summer months, and while the atmosphere is undergoing very rapid cooling by the passage of the currents from northern latitudes.

By taking advantage of these natural phenomena, the Russians accomplished successfully the first stage of the battles of Balaklava and Inkermann, in the months of October and November. They brought their dense columns undiscovered, into close apposition with the outposts of the allies, by advancing along the deep valleys and ravines, in the conformation of the country, that were filled up with dense mists and fogs. The allied forces were not assisted by

these natural phenomena in their assault on the enemy's fortifications at dawn on the 18th of June.

The season when these phenomena occur most frequently on land, differs from that when the sea fogs, that have been so much dreaded, are formed along the coasts. In the spring and early summer, these render the approach to the shores of the Crimea hazardous, and they often produce great injury when driven in over the land, by blighting the early crops. They occur only at that season, because it is only then that the rivers bring down the waters of thawed snow and ice to mix with the warm currents of the sea.

In describing the marine currents, it was shewn how the admixture took place, of a great body of warm saline water from the south, with the colder river water from the north, over the northern area of the Black Sea, commencing at the straits of Kertch and extending to the Danube, between which points lie the mouths of the rivers that drain a very wide surface of the eastern and central Europe. By this mixture of liquid masses of different temperatures, saline constituents, and densities, much of the sensible heat of surrounding media is abstracted from them, and rendered latent in the particles of the mingling currents. The atmospheric capacity for vapour is diminished so far, that precipitation in the form of watery particles is effected; and these remain suspended in the air, in consequence of the surface of the sea being warmer than the suspending medium. The condensation of these particles forms the sea-fog, which becomes the more dense in proportion as the air is less disturbed by winds.

From the frequent changes of atmospheric temperature, caused by changes of the winds, these sea-fogs rarely last more than four or five days. Their revaporisation may be effected by either of three processes :—

By increase of force of the southerly winds, through which the capacity for vapour is increased by the heat generated by motion of the atmospheric atoms; the fog being driven before it is thus partially dispelled, and the remainder, being carried in over the warmer land, is there reconverted into vapour.

By the influence of still colder currents of air from the north, that cause, by the still further abstraction of heat, the coalescence of the watery particles, which are then deposited in the form of rain.

Lastly, by the direct power of the sun's rays in penetrating the bed of condensed vapour, and rarefying it by heat, so that it is slowly lifted from the surface of the sea, and dissipated as it ascends.

4. *Electric Disturbance.* The phenomena of restoration of equilibrium were of almost nightly occurrence during the summer months, when lambent sheets of lightning were seen to play among the clouds, agitated around the Tchatir Dagh, and the ridge of the less collected coast range. These were ordinary phenomena that indicated moderate interchanges, without any high degree of electric tension, between the northerly and southerly currents of air, aided by the inductive action of the high points of land. In addition to these, there was a peculiar liability, considering the position of a country that lies about midway in the temperate zone, to storms with violent interchanges of electric fluid, in forked explosions that indicated the highest amount of electric tension: and these storms were always preceded by a few days continuance of northerly wind with a hazy cloudless sky, and a hot parching state of the atmosphere. This hot dry current being in a state of minor electric tension, meeting with the south wind, bearing clouds replete with moisture and surcharged with electricity, violent electrical action was readily elicited by friction of the opposing currents of air; and thunder storms for the restoration of the electric equilibrium, with sudden condensation of vapour in very heavy falls of rain, were produced. The most violent of these storms occurred at night, and the intervals between them rarely exceeded a fortnight. They were so local in extent, that they scarcely ever involved simultaneously the positions of the camps on the plateau, at Balaklava and at Kamiesch, that form as it were the angles of a triangle, not exceeding six miles in its longest side.

Two memorable events define, approximately, the periods within which they occurred with greatest frequency. On the 22nd of June a thunderstorm burst over the plain of Balaklava and the valley of the Tchernaia, without making itself felt in the camp on the heights of Sebastopol. Portions of the railway were broken up by it, and huts, men, and cattle were carried away by torrents that overflowed the water channels of the plain. On the 14th of September, the army landed at Old Fort, and on the night of their disembarkation their position was deluged by a heavy fall of rain; and, being without tents, the soldiers suffered very greatly, in consequence of the drenched state of their equipments, and the sodden condition of the soil.

These violent changes, although attended by more or less of local or personal injury or inconvenience, were productive of a most salutary effect, as, through their agency, the months

of July, August, and September, usually the most unhealthy months in the Levant, were rendered more agreeable to the sensations than the earlier months of May and June.

About the same period as that of thunder-storms, small whirlwinds were seen to play across the low lands, raising slender columns of dust, sand, and stones, to a high elevation. They resembled, in form and appearance, the waterspouts met with at sea; and as many as four of these phenomena have been counted at one moment, progressing over the plain of Balaklava, their cloud-base dipping occasionally towards the earth, and their tube-like pendent extremity being deflected by different strata of the atmosphere, through which they travelled slowly along.

From the repeated heavy falls of rain that occurred while bombardments were actually in progress, it may be suspected that electric changes with condensation of moisture resulted, in some degree, from the ascent of heated columns of air containing gaseous particles, the products of explosions, capable of undergoing further chemical changes, and of exciting electric activity by that process.

The camp diseases of this period were fevers, of varying type, usually presenting a periodic or paroxysmal form; scorbutic cachexy, in its protean forms; cholera, diarrhœa, dysentery, and jaundice. It remains to be determined how far those diseases clearly originated in, or were aggravated by, climatic influences.

The allied forces, who landed in the Crimea in the autumn of 1854, brought with them the choleraic agencies, which had lost their epidemic intensity previously to embarkation, but had retained sufficient energy to produce many fatal cases during the voyage.

On the night of landing, the troops were exposed to a drenching rain that fell like a torrent, being one of the summer thunder-storms. During the march to Sebastopol, they lay without shelter on the ground, exposed to the night dews, so abundantly deposited at that season of the year. Of necessity they were rationed on salted meats, which excited thirst, to assuage which they found no pure water, and indeed but little of any kind; and they ate with avidity the unripe grapes that grew plentifully along their line of march. After that fatiguing morning advance, and the hard fought day of Alma, they bivouacked on the field they had won, which had been previously occupied by the encampment of the routed enemy, who, it was said, had not been free from cholera; and on the second day after the battle, the epidemic again broke out in their ranks.

In preparation for the continuation of the march on the following morning, about sixty sufferers were brought to the sea shore over night, to await removal to the transports in the offing. The renewed march, the counter march, the busy preparations for the siege, and the sustaining excitement of high hopes of a speedy favourable termination of the bombardment, served to restrain the ravages of disease, and to prevent its again assuming epidemic characters, although scattered cases were always present in the camp; and the great proportion of officers attacked at this time was very remarkable.

This incident seemed to disclose the reason of the exemption of officers from cholera in garrisons, where they use a generous diet; since, where they were undergoing the same privations as the private soldier, living on a bare diet, and subject to equal fatigue, there was to them no such immunity from epidemic disease, but rather an increase of liability to it. The observation was not confined to army officers, who had undergone marches, fought a great battle, and lain on the ground a fortnight without the shelter of tents; but it was equally exemplified among the officers of the Naval Brigade, who had come from their ships, in which cholera is not a disease of officers, uninfluenced by the above predisponents, to be subject only, in common with army officers, to unusual poverty of diet, and the use of impure water.

The causes that sustained the health of the army were greatly augmented in efficacy by the fine mild weather, that lasted up to the commencement of November. By this time, the high hopes of the result of the bombardment were destroyed, as it had produced no very evident effect on the resources or on the spirit of the enemy; and, on the other hand, the battles of Balaklava and Inkermann had made it too evident that the besiegers were themselves reduced to the defensive; and further, that a difficult position was to be maintained through a rigorous winter, which had already come on them without any preparation on their part to meet it.

Gloomy anticipations had already overspread the minds of men, when the great gale of the 14th of November diminished the resources of the army in food, clothing, and ammunition; and the sum of evils was now completed by the sudden accession of the cold and wet of winter, which destroyed the roads, and rendered the communications between the port and the camps a matter of great difficulty. Under these combined circumstances of physical deprivation and mental

depression, the previously concealed effects of the long continuance of a diet deficient in many of the staminal principles of healthy food, made themselves known with redoubled energy and by sudden outbreak. In this course of events, the climate, it must be observed, played but a secondary part, as one of the developing causes, and not as the essential. From the first week of December to the first of February, the embarkation of sick at Balaklava was about one thousand a week.

The scorbutic dyscrasy had grown up, producing pains of the limbs that disabled men from active exertion, deteriorating the vital properties of the blood, and diminishing vital cohesion,—morbid changes that preceded the extravasation of blood and ulceration of the soft tissues. The constitutional powers being thus undermined, there was less resistance offered to the impulse of the common causes of disease. The diminished digestive power of the relaxed mucous membrane could no longer operate on the imperfect diet; diarrhœa of the lienteric form shewed its proofs in every direction in the camp. The defective food continuing to act as an irritant on the weakened membrane, a low form of inflammatory action, speedily running on to ulceration, attacked the intestinal surface; and, its first and principal seat being the large intestine, the disease fell under the denomination of scorbutic or camp dysentery, evidently a disease of imperfect nutrition.

The choleraic or epidemic type, with its pathognomonic collapse, became less frequent as the above form of disease advanced; but up to January there was a series of cases of its typical character. There continued throughout the season a serous diarrhœa, in which chylous globules were often seen in the evacuations. This appeared to be closely allied to cholera, leading with slower steps, but with equal certainty, to the grave, proving fatal by extensive change of structure, marked by softening of the villous coat of the small intestines.

This form of disease could scarcely be considered dependent on climatic causes. It was an epidemic that seemed not to find in the bodies of men, whose systems had undergone changes from conditions existing in the camp, that material requisite to the reception and development of its essential germs. But it was otherwise with men who arrived in the scene with unvitiated constitutional powers, as almost every new regiment that landed at Balaklava in the winter suffered from cholera with collapse very shortly after landing.

The fever cases of this period were the only kind of disease that bore the impression of causes rightly attributable

to the climate or locality; although even these are capable of receiving great aggravation from the accidental causes productive of camp diseases in general. The cases were characterised by great prostration of nervous power, crusted teeth and tongue, typhomania, absence of rubeoloid or petechial eruption; and, in their course, pneumonia was a frequent complication. In all of them there were evident morning remissions of all the symptoms, with severe exacerbations as night approached. The patients were very successfully treated by regarding (as of chief importance) the periodic nature of the fever, during the nocturnal paroxysms of which the affected organ underwent an increase of its inflammatory excitement. Proceeding on these indications, quinine was administered in doses of from four to six grains, repeated every third hour from daylight to noon, as long as the accession was deferred; sometimes wine was given with the quinine; and, by this treatment, there were effected a postponement and an ultimate cessation of the periodic accessions, in which hot skin, delirium, cough, and rusty viscid sputa were the prominent symptoms that called, during the paroxysms, for the exhibition of antimonials and counterirritant applications.

In these cases of the fever of prostration with periodic exacerbation, endemic causes influenced the development of morbid phenomena—the results of poverty and want, not indigenous to soil or climate, but generated wherever like causes exist.

The months of December and January, the period of greatest moisture succeeded by that of most intense cold, saw these social causes in extreme force; and it was then, that their morbific agency was exemplified in the greatest number of cases.

In February there was a great amelioration of the weather as regards temperature, moisture, and the aspect of the sky; and simultaneously with this, there was a great amendment of the defects of diet and clothing, which effected a rapid decline of the forms of disease above noted. The adynamic type of fever disappeared, and bowel diseases decreased rapidly in frequency; and, what was a still better indication of a good sanitary condition, they were reduced to simple forms, devoid of choleraic or scorbutic features.

The absence of tubercular disease throughout this trying season is almost as significant, pathologically, as the undue frequency of other diseases; as, in a *primâ facie* view, it affords an argument in favour of the climate of the Crimea being opposed to the development of that cachexy; further

experience is, however, required on this point. Some importance attaches to this, that when causes productive of general diseases, especially those of epidemic or endemic origin, or those that expend their morbific impetus on any particular set of organs, predominate, then other sets of organs possess a certain amount of immunity from diseased actions that ordinarily develope themselves in their tissues.

The improvement of general health was progressive through March; and it may be said to have reached then its highest point, as there was almost an entire freedom from the diseases that had prevailed in the winter. Towards the end of that month, and in the beginning of April, it was observed that the greatly increased solar heat during the day, co-operating with dampness of soil produced by frequent showers, brought forth a most luxuriant vegetation, and effected a very rapid decomposition of dead organic matter, so that in every part of the camp, in the cemeteries and refuse-pits, carcases that had been carelessly buried in the winter made their position known by exudations of putrid sanies that blackened the soil, and polluted the neighbouring atmosphere.

These noxious sources of unhealthy principles required several weeks for their extinction, by means of layers of charcoal, quick lime, and fresh soil; but during the period of their activity, the atmosphere being much cooled at night, mists and fogs were common phenomena; and these served to concentrate the foul miasmata, condensed together with the aqueous vapour with which they had risen from the soil.

Fevers now began to be the most frequent form of disease. Of continued type on their first invasion, they assumed sooner or later periodic types, without any marked tendency to visceral implication. There was in them a determination to the surface rather than towards internal organs; crises by sweating were of ordinary occurrence. and the treatment by tartar emetic with laudanum was found very successful in subduing the pyrexial action.

At this time there were some outbreaks of eruptive fevers —small pox and measles,—in ships of the fleet, that were beyond the range of the asthenic or miasmatic agencies operating in the camp. These latter diseases must have been brought from distant shores; they did not extend to the camp.

In the third week of April, and again in the second week of May, cholera with collapse, that had been unseen through three months, made distinct outbursts, following, on each occasion, falls of rain after continued drought, while the mean temperature was on the increase. In the camp it was most frequent, at first, among men doing the duties of the trenches;

some of the earliest cases being brought out of them. Certainly there was much of refuse matter in these places, which acted as drains to the higher ground; and many corpses of the killed in the batteries had been hastily interred in the immediate vicinity. In the harbour of Balaklava it was most prevalent among the vessels lying on the town side, at the wharves that had been raised in level, through the winter, by a concrete accumulation of mud and decaying vegetable and animal matter.

It was observed again now, as in the depth of the winter, that while the disease was but little inclined to become epidemic among bodies of men that had become habituated to the specific causes, as they slowly gained force, it produced its fullest epidemic action on those brought suddenly within their influence. Our own Land Transport corps, and the army of our gallant allies, the Sardinians, suffered terribly from the disease in its very worst form. The malady, as it existed among them, was brought almost within the same category as many of the recorded outbursts among our armies in motion in India, when they have seemed to march suddenly into the very stratum or bed of localised choleraic agencies.

Although the disease appeared to have revived in the spring, under the combined action of heat and moisture, yet there was noticed to be a great and permanent amelioration immediately subsequent to the very heavy thunder-storm of the 22nd of June, from which we may date its decline. As the summer season advanced the disease abated everywhere in frequency and in severity; and with the decline of this disease, whose action is to drain the blood of its albumino-fibrine and watery particles, there was an increase of purely inflammatory affections of the bowels, mostly confined to the large intestines.

One pathological feature pervaded the autumnal diseases, viz., disordered hepatic function, marked in some cases by signs of inflammatory excitement of the organ; in some, by suppression or by reabsoption of its proper secretion, constituting jaundice; and in other cases, by the secretion of large quantities of bile of an acrid or irritating quality, that often accompanied the dysteric purging.

Thus, the diseases of the abdominal viscera were the chief organic affections of the season. The fevers of the hottest part of the summer and autumn all presented some form of derangement of the function of the liver; and, in the severest cases, they were closely assimilated to the fatal bilious-remittent fever of tropical climates.

I have thus attempted to demonstrate the most obvious peculiarities of the climate of the Crimea and to shew what were the most prevalent types of disease. It appears to me that, before we affix to these the intimate relations of cause and effect in any but the clearest instances, the full support of analogies taken from the history of similar diseases in other countries and situations, should be found to concur with our inferences, as to the climatic conditions that may have affected prejudicially the health of the allied armies; and further, that to exclude all adventitious causes of disease, which do not properly belong to the climate or locality, but which have been introduced by, or have risen among, the sufferers themselves, is especially necessary before we proceed to condemn a climate as unhealthy. To do this we require to know more of the country, and more concerning the usual sanitary conditions of the city of Sebastopol itself, previous to the siege, than we are at present acquainted with. An exact knowledge of the pathological conditions existing among the besieged would also aid very much in our estimation of the causes that gave origin and intensity to those of the besiegers.

It may be admitted that, if the expression *climatic causes of disease* is restricted to those which are exclusively atmospheric or electric, this paper will fail to bring to notice any of these agencies, as having originated the diseases of which the "Returns" are chiefly made up.

The most numerous morbid affections, according to nosological arrangement, have been, for the most part, such as are imputable to the common causes of disease, as excessive labour together with defects of shelter, diet, and clothing; or to specific essential causes, often aroused into action, and aggravated in extent and intensity by the co-operation of those common causes.

Thus the ordinary forms of *diarrhœa*, the phenomena of *disordered hepatic function*, and that simple type of *dysentery* which does not tend to ulceration of the mucous surface, are but ordinary pathological conditions, that exist under circumstances wherein the nature of the food is ill suited to the wants of the system, especially under the influence of an elevated temperature.

Scurvy, which gives a taint to the system that greatly aggravates all these maladies, and imparts to them worse features, arises from defective nutrition.

Climate has but a remote influence in the production and growth of any of these maladies. It may be the predisposing cause to some of them, and may rank among the "lædentia"

in all; but, of itself, it can scarcely become the exciting cause.

Again, diseases of a zymotic character, as *cholera* and *choleraic diarrhœa*; and the *low forms of fever* that exist, under fixed conditions, in all countries within certain latitudes, cannot be rightly assigned to the agencies of locality or climate as their essential cause.

Fevers of periodic form, remittent and intermittent, are universally admitted to be of endemic origin; and the success of medicine in their prevention and treatment is based on this principle. In the Crimea, cases of simple continued fever were rarely seen. Whatever the prominent features in the case of fever, even in those of the worst typhoid class, there was always to be observed a distinct tendency to remissions; and I cannot hesitate to accept as the cause of this, the impression of morbific agencies of local origin.

What really constitutes the specific cause which we term "malaria," is still unknown to us; and we can only regard it as one of those insensible potencies which produce constant and certain results, the mode of action of which is hidden from us.

It is not questioned that, in those districts where they are rooted evils, there are distinctly circumscribed localities in which the chances of morbific impregnation are greatly in excess of the average of the entire district; in this there is clearly observable a concentrability of the essential cause analogous to that which is found in cholera and typhus,—diseases of the zymotic class.

Again, that the intensity of *malaria*, like that of the essential causes of those other diseases, may be greatly modified by the influence of man, stands boldly forth in these facts,—that while he has it in his power, by industry, to reclaim lands which have been uninhabitable from this cause, other provinces that were once the seats of arts and sciences, abounding in all the appliances that wealth could produce, and teeming with a busy population, have, as civilization has declined, and the cultivation of the soil been neglected, become uninhabitable from the growth of this cause of insalubrity.

From this it may be inferred that malaria is not a principle inherent in the atmosphere of any locality, but is something which exists adventitiously in the soil, and is imparted by it to the atmosphere under certain conditions, and that it is capable of being increased by man's inattention to the laws of health, or of being eradicated therefrom by his labour.

To apply these remarks to the present instance, I would

say that the configuration of the surface presented much of open and elevated plains; and that, for the most part, the requirements of the besiegers allowed these to be the site of the encampments; and it is admitted that, in those cases where events proved the necessity of removal of any portions of the forces from localities in which the sanitary conditions were injurious, such removal was had recourse to.

The undulations of the surface, and its gentle declivities ending in ravines, presented facilities for the shed of its waters; and although, from the shallowness of the soil, the ground, where much trodden on, in the rainy season, was quickly broken up into a state of quagmire, yet, as the soft cretaceous rock, covered only by a thin sward, absorbed much moisture, the return of a few days, or even of a few hours, served to restore to the ground a tolerable state of dryness.

There were certainly some positions that were less healthy than others; and these may be described, in general terms, as possessing a deeper soil more retentive of moisture, and seated, like avenues of amphitheatres, in little hollows or basins at the foot of hills or of rising grounds, having water sources at their lower margins.

When troops are encamped in these positions—and the necessities of an army will render this unavoidable at times—then the foci of many diseases, especially of fevers, will be found amongst them. Of this, I believe, some instances have been seen in this expedition; and, in the effort to remedy such defects, proof has been afforded that careful drainage of the soil ameliorates greatly, if it does not at once destroy, the localised causes.

Another circumstance, more strictly related to atmospheric conditions than that just alluded to, viz., the great and rapid changes of temperature so frequent in the winter, and usually attended by hygrometric changes, was a well marked cause of increased sickness.

Perhaps under ordinary aspects of life in the Crimea, when possessed of good shelter, and sufficient food and clothing, such changes of the weather would be but little felt, and not in such degree as to be productive of disease. And even as it was in this instance, with a low degree of these safeguards of health in operation, this variability of temperature and air did not appear to give rise to any new types of disease, but to augment the already existing morbific tendencies.

In conclusion, I would state the opinion entertained by me, deduced from the facts I have embodied in this paper, to be, that the climate of the Crimea ought not to be classed

with those proved to be unfavourable to health; and, that whatever is shown to have acted prejudicially to health, has been of such modified influence that it would scarcely be felt under ordinary social conditions.

QUARTERLY REPORT OF THE PROCEEDINGS.

Monday, March 2, 1857.

PRESENTATIONS.

The following donations to the Library of the Society were announced:—

1. On the Treatment of Cholera. By Henry Jeanneret, M.D. Presented by the Author.

2. Die Ruhr nach ihrem endemischen und epidemischen Vorkommen, von ätiologisch-pathologischen Standpunkte geschildert, von Dr. August Hirsch in Danzig.

3. Monatsblatt für Medicinische Statistik und öffentliche Gesundheitspflege, Nos. 4, 5, 6, 7, 8, 9, 10, 11. Beilage zur Deutschen Klinik. Herausgegeben von Dr. Göschen und Dr. S. Neumann.

The above German works were presented by their respective authors through Dr. Weber, Foreign Secretary for Germany and Russia.

4. Essai de Mortalité comparée, avant et depuis l'introduction de la Vaccine en France, par H. Carnot, ancien Officer d'Artillerie, Membre de Legion d'Honneur. Presented by the Author.

NEW MEMBERS.

Non-resident.—Geo. W. Spence, M.D. of Lerwick, Shetland.

John N. Radcliffe, M.R.C.S. of Bramley, Leeds, was proposed as a non-resident member.

NEW OFFICERS.

The President, Vice-Presidents, the Council, the Treasurer, and the Honorary Secretaries and Foreign and Colonial Secretaries for 1857-8 were proposed for election at the meeting in April.

PAPER READ.

"On Puerperal Fever" (concluded). By E. W. Murphy, M.D. The paper was discussed by Dr. Tripe, Dr. Chowne, Mr. Hunt, and Dr. Milroy.

TRANSACTIONS

OF THE

EPIDEMIOLOGICAL SOCIETY OF LONDON.

Papers and Communications.

THE MORTALITY FROM THE ERUPTIVE FEVERS AT DIFFERENT PERIODS OF THE YEAR.

By J. W. TRIPE, M.D.

A KNOWLEDGE of the period of the year at which the eruptive diseases prove most fatal, and of that at which they cause their minimum of mortality, appears to me an important step towards ascertaining some of the conditions which favour or diminish their spread. In order to obtain this knowledge with as much exactitude as possible, I have formed two sets of tables from the immense mine of information contained in the weekly and other returns of the Registrar-General, and have extended the inquiry over seventeen years, viz., 1840 to 1856 inclusive. For the convenience of future reference, I have divided this period into two; the first containing the ten years, 1840-49, and the other the seven years, 1850-56. During the latter period I have tabulated the return for each week in each year separately; whilst, during the former, I have tabulated only the total of the corresponding weeks in the ten years. In this way I have been able to ascertain the week in which each of these diseases culminated, and *vice versâ*, and how far these events corresponded in each year, and to point out some of the causes of their variations. But the immense labour that would have been necessary fully

to consider this subject, being far greater than I could undertake, and the space it would occupy being far in excess of the ordinary limit of a paper, compel me to leave this part of the subject comparatively untouched.

Until the causes which induce death in this country had been registered with some exactitude for many years, no certain data could be obtained for such an investigation as I propose; nor indeed has sufficient time elapsed even now, to place this matter on a firm basis, in consequence of a variation every year in the tendency of all diseases to assume more or less of a certain type, inclining either towards a sthenic or an asthenic form.

As the type of disease, that is to say, its tendency to assume a certain form, varies according to the atmospheric constitution of the year (Sydenham's expression), it is very evident that, if this tendency do not depend on thermal or other seasonal variations, the course of the diseases themselves must be influenced in an uncertain degree by atmospheric variations; for the same results can only be produced by identical causes. The asthenic type which all diseases have had a tendency to assume during the last fifteen years, cannot depend on the thermal variations of the year, as the climate of London has passed through an ascending course of temperature during the years 1841-47, a descending course during the years 1847-52, a sharp ascent in the following year, and a sharp descent in 1854. Further, observations since 1771, registered with great accuracy, which have been subsequently reduced and corrected with great care by Mr. Glaisher, show that the climate of London has passed through a series of ascending and descending curves. I give the highest and the lowest elevations: in 1771 the mean temperature was 45·4°; in 1779, 51·2°; in 1784, 45·1° (1st period); in 1794, 48·9°; in 1797, 45·7° (2nd period); in 1806, 50·5°; in 1814, 45·8° (3rd period); in 1822, 51·0°; in 1829, 46·0° (4th period); in 1834, 51·0°; in 1838, 46·4° (5th period); in 1846, 51·3°; in 1855, 46·6°. We thus see that the thermal line has described a series of ascending and descending lines—not absolutely curves, for the yearly rate of increase or decrease has not been precisely accurate; and yet the type of disease has not followed these thermal elevations and depressions, but has gradually changed, it may be with the habits of the people, but more probably, as similar transitions have been noticed by the older physicians, from other definite but varying causes with which at present we are unacquainted.

In making these observations, it must not be supposed that I ignore the influence of other important atmospheric elements, viz., variations in the humidity, electricity, and weight of the atmosphere, the direction and force of the wind; for I have long since shown that they exercise great power over the mortality of one of the eruptive fevers, viz., scarlet fever. But, as before stated, the difficulty of ascertaining the effects produced on health by a varying intensity of these meteorological elements, and the immense space required for their consideration, prevent me from doing more than allude to the subject. I shall, therefore, confine myself to pointing out the periods at which the eruptive fevers induce their greatest and lowest rates of death, and mention the average temperature of those periods. I shall also show, by a comparison of the deaths in each of the four quarters of the year, and of the mortality in the period 1840-49 with that in 1850-56, and also of the mortality in these quarters with their temperature, that temperature does exercise a great influence on the mortality from the eruptive fevers.

It is not my intention to point out the causes of death in the eruptive diseases, although it is very evident that in classifying deaths under these heads, we are including those from almost all the acute maladies. Thus, measles induce death chiefly from inflammatory disease of the lungs; scarlatina from blood-poisoning, throat disease, inflammations of the solid viscera, etc. The necessity of the case requires that the deaths should be registered on the present plan; hence it is impossible, even if desirable, to separate the uncomplicated from complicated cases. If the inflammatory complications which arise during the progress of cases, whether fatal or otherwise, of the eruptive fevers, could be ascertained in large numbers, and over a long period of years, and then compared with variations in the meteorological elements, much curious and practical information might be obtained.

I have entered the deaths in the week during which they were registered, and not subsequently, as they are usually registered about three days after death; a whole week's alteration would have been too great. The dates are therefore wrong to the extent of three or four days: a space of time too small to deserve much notice.

1. Small-Pox. In the period 1840-49 the mortality from this disease presented two periods of elevation and of depression. The first period of elevation occurred during the first and third weeks, and the second during the twenty-third

and twenty-sixth weeks; and those of depression during the fifteenth and thirty-eighth weeks. In the years 1850-56, there were also two periods of elevation and depression: the former occurred in the first, fourth, and fifth weeks, and also in the twentieth and twenty-first weeks: whilst the periods of depression happened in the thirteenth and thirty-ninth weeks. The first period of elevation occurred, therefore, in January in 1840-49, and in January and the first week in February in 1850-56: the second period of highest mortality happened in June in 1840-49 and in May 1850-56. The first period of lowest mortality happened early in April during the years 1840-49, and at the end of March in the years 1850-56: the second period of lowest mortality occurred in the month of September in the periods 1840-49 and 1850-56. During the period included in the years 1840-49, the highest mortality from small-pox in the ten corresponding weeks was 262, which occurred in the first week of the year; in the second week it was 214, in the third 254, and thence it declined to 123 in the fifteenth; it then ascended to 186 in the twenty-sixth week, and again descended to 142 in the thirtieth week, from which it rapidly increased, and remained almost stationary during the forty-fourth to the fifty-first weeks. During the years 1850-56 there were registered in the following seven corresponding weeks these numbers of deaths; in the first week 128, in each of the fourth and fifth weeks 129, in each of the sixth and seventh weeks 128, thence they declined to 83 in the thirteenth week, then increased to 133 in the twentieth week, declined again to 68 in the thirty-ninth week, and gradually rose until, in the last week in the year, the mortality was 117.

In the years 1840-56 the aggregate mortality from small-pox was 14,257. Of this number 3267 deaths were registered in the spring quarter, 3406 in the summer quarter, 3322 in the autumn, and 4262 in the winter. By spring quarter I mean the months of March, April, and May; by the summer, June, July, and August; by autumn, September, October, and November; and by winter, December, January, and February. Of the aggregate mortality, 22·9 per cent. occurred in the spring quarter, 23·9 per cent. in summer, 23·3 in autumn, and 29·9 in winter. Taking the whole period, it is evident that small-pox is most fatal in winter and summer and least fatal in spring. To ascertain how far these results might be depended on, I divided this period into two as before, and obtained somewhat different results; in 1840-49 the highest mortality occurred in winter, 30·0 per cent., the

next in autumn, 25·5 per cent., and the lowest in spring, 21·0 per cent. In 1850-56 the highest mortality also happened in winter, viz., 29·7 per cent., the next in spring, 26 3 per cent., and the lowest in autumn, 19·4 per cent. To show how considerable this variation was, I put the percentages in opposition to one another. In spring, 1840-49, the mortality was 21·0 per cent.; 1850-56, 26·3 per cent.; in summer, 1840-49, 23·5 per cent.; 1850-56, 24·6 per cent.; in autumn, 1840-49, 25·5 per cent.; 1850-56, 19·4 per cent.; in winter, 1840-49, 30·0 per cent; 1850-56, 29·7 per cent. I will put these in a tabular form.

Percentages of Deaths from Small-Pox.

Years.	Spring.	Summer.	Autumn.	Winter.
1840-56	22·9	23·9	23·3	29·9
1840-49	21·0	23·5	25·5	30·0
1850-56	26·3	24·6	19·4	29·7

The two periods agree therefore in this, viz., that the winter is the season during which the mortality from small-pox reaches its culminating point. The question then arises, on what do these differences depend? As before stated, I can only reply to this in respect to temperature, and that very briefly.

An examination of the temperatures for the two periods shows that, whilst the mean temperature for the first period, 1840-49, during the spring quarter, was 1·3° in excess of the average since 1771, that of 1850-56 was 0·5° less, having been the coldest series of spring quarters since 1789. In the summer quarters the mean difference was very slight, viz., 0·2° only; in autumn, the mean temperature for 1840-49 was 0·8° above the average, whilst that of 1850-56 was 0·9° below; in winter the mean of 1840-49 was 0·9° in excess, and of 1850-56 no less than 1·6°. We, therefore, see that with a series of warm springs there was a small comparative mortality from small-pox, and with a series of cold springs there was a large comparative mortality; with summers of nearly equal warmth the rate of death varied 1·1 per cent., the largest mortality having happened also in the cold seasons; in autumn the smallest comparative mortality was coincident with the lowest mean temperature, and in winter with the highest. The highest mortalities in each period were coincident with a temperature of 37·6° and 38·7°; the periods of lowest mortality with a temperature of 46·5° in 1840-49, and of 56·5° in 1850-56. These latter results must be reasoned on with some caution, as the disease prevailed to a far greater extent in the first than in the second period.

Measles. I select measles as next in order for con-

sideration, because it is so placed in the Registrar-General's Returns, and also because in its mortality at the different seasons it is more closely allied to small-pox than to any other of the eruptive fevers.

In considering the rate of mortality from small-pox, I have pointed out that there are two periods of elevation and two of depression. Measles, however, presents, in a marked degree, but one period of elevation and one of depression. The highest mortality registered in the ten corresponding weeks of the years 1840-49 was 895, and in the seven weeks of the years 1850-56, 202; the lowest mortality in the ten corresponding weeks of the years 1840-49 was 159, and in seven corresponding weeks of 1850-56 was 81: so that the greatest average weekly mortality from measles was rather above double its minimum, both in 1840-49 and in 1850-56. The highest mortuary rate in 1840-49 occurred during the fifty-first week, and in 1850-56 during the forty-ninth week; and the period of greatest mortality in each case commenced rather suddenly at the forty-eighth, and fell almost as suddenly in the fourth week, that is to say, occurred in December and January. In 1840-49 the rate diminished regularly, with one or two exceptions, to the sixteenth week, and then rose gradually to the nineteenth and twentieth weeks, when it took a leap, and then remained about stationary till the forty-fourth and forty-fifth weeks, when it took another leap to make its final rise at the forty-eighth week. During the years 1850-56, when the disease proved much less fatal, its course was somewhat different; for, having made a sudden descent at the fifth week, it as suddenly rose again at the seventh, and continued high to the seventeenth week, when it again declined somewhat, to rise again at the twenty-fourth week, to fall very suddenly at the thirty-fourth, and to obtain its lowest point at the thirty-eighth week, and thence rise to its maximum at the forty-ninth week. The aggregate mortality from this disease in the years 1850-56 was 20,676, of which 13,096 were registered in the years 1840-49, and only 7580 in 1850-56. Of the 13,096 deaths in 1840-49, 2436 were registered in spring, 3134 in summer, 3699 in autumn, and 3827 in winter; and of the 7580 in the years 1850-56, 2043 were registered in spring, 2002 in summer, 1370 in autumn, and 2165 in winter; or in the following ratios for the whole period, 21·7 per cent. in spring, 24·9 per cent. in summer, 24·5 per cent. in autumn, and 28·9 per cent. in winter.

These statistics, therefore, show that measles, like small-pox, is most fatal in winter, next in summer, and least

fatal in spring—that is to say, if the aggregate quarterly numbers of the seventeen years be taken as the data. When, however, we come to compare the mortality in the two periods, we find a difference in the results as compared with the whole period, but a difference which is met with in both these diseases. In 1840-49 the mortality from measles during the winter quarter was 29·2 per cent. of that for the whole year, and in 1850-56, 28·6 per cent.; from small-pox it was 30·0 and 29·7 per cent. respectively. In the summers of 1840-49 the percentage mortality of measles was 23·9, and of small-pox 23·5 per cent.; whilst in 1850-56 that of measles was 26·4, and of small-pox 24·6 per cent. In the autumnal quarters of 1840-49 the rate of death from measles was 28·3, and of small-pox 25·5; whilst in 1850-56 it was only 18·1 per cent. from measles, and only 19·4 per cent. from small-pox.

A similar coincidence happened in the spring quarters, for in 1840-49 the mortuary rate from measles was 18·6, and from small-pox 21·0 per cent., whilst in 1850-56 it was 26·9 from measles, and 26·3 per cent from small-pox. Now, it is quite evident that some causes must have been in operation to have produced these results; and, as pointed out in considering small-pox, the springs of 1840-49 were unusually warm, and those of 1850-56 unusually cold. The same was the case in the autumns; whilst the winters of both periods were warmer than usual, and especially those of 1850-56. The conclusions, therefore, which we draw from these data are similar to those which have been deduced in regard to small-pox; viz., that as, during the spring quarters in which the temperature was above the average, the comparative rate of mortality from measles was low, and as during the cold springs it was high, a series of warm springs produces a less mortality from measles than a series of cold springs; and also that a similar statement applies to the winter quarters: whilst, on the contrary, the series of warm autumns were coincident with a high rate of mortality, and the cold autumns with an unusually low rate of deaths from measles. The highest mortuary rate in 1840-49 was coincident with a mean temperature of 39·7°, and in 1850-56 with 39·9°; its lowest rate in 1840-49 with 47·9°, and in 1850-56 with 56·2°. The following tabular arrangement enables the percentages of mortality to be read at a glance:—

Percentages of Deaths from Measles.

Years.	Spring.	Summer.	Autumn.	Winter.
1840-56	21·7	24·9	24·5	28·9
1840-49	18·6	23·9	28·3	29·2
1850-56	26·9	26·4	18·1	28·6

Scarlatina. The rate of death from scarlet fever, although it presents a greater range between its highest and lowest points, oscillates, in a given period, much less than either small-pox or measles, and the periods of elevation and depression are subject to less variation. In the years 1840-56, the total deaths from scarlatina were no fewer than 33,451, of which 18,582 occurred in the ten years, 1840-49, and 14,869 in 1850-56. In each of these, the disease presented one period of elevation and one of depresssion; in 1840-49, the former extended from the thirty-eighth to the forty-fifth week inclusive, and in 1850-56 from the fortieth to the forty-seventh week, lasting, in each case, for eight weeks. The period of depression in 1840-49 commenced at the tenth week, and ceased at the nineteenth; in 1850-56 it began at the eighth week, and terminated at the sixteenth: the former period embraced ten and the latter nine weeks. The smallest number of deaths registered in ten corresponding weeks of the years 1840-49 was 215, and in seven corresponding weeks in 1850-56 it was 173; these numbers were registered in the fourteenth week in 1840-49, and in the eleventh of 1850-56. The commencement of the depression, as well as the week of lowest mortality, occurred earlier in 1850-56 than in 1840-49. This, probably, arose from the months of March in 1850-56 having been colder than those of 1840-49, and accords with the observation I made in my former essay on scarlatina, viz., "that when the temperature of March is higher than that of the previous February by an amount greater than the ordinary excess, the comparative mortality will also be in excess; and when the temperature is below the comparative and monthly mean, the comparative mortality will also be below the mean." The week in which the disease reached its culminating point in 1840-49 was the forty-first, when it caused 605 deaths, or nearly three times the number which were registered when the disease was at its ebb; in 1850-56 it was most fatal in the forty-fourth week, when it caused 462 deaths, nearly a similar increase to that which happened in the former period.

The highest mortality in any one year, if the year be dated from the 1st of January, does not always occur at its end, as a number of deaths, when the disease is epidemic, smaller than has occurred at its highest period, may be larger than will happen in the following autumn. This took place in the first weeks of 1853 and 1855, when the mortality from this disease was 67 and 85 respectively, and the greatest number of deaths in the following autumn was 59 and 76. To esti-

mate the effects of atmospheric vicissitudes on this or any other epidemic disease, we should start from the time at which the smallest mortality occurs, trace the disease onwards to its highest point, and follow it until it again reaches its lowest; always bearing in mind that the cause must precede the effect for some definite period.

Of the total mortality in the years 1840-56, viz., 33,451, 6042 deaths happened in the spring, 7910 in the summer, 11,706 in the autumn, and 7793 in the winter quarters; or in the following ratio, 18·0 per cent. in spring, 23·6 per cent. in summer, 35·2 per cent. in autumn, and 23·2 per cent. in winter. This disease is, therefore, by far more fatal in autumn than in any other season, and, as before shown, rages most furiously from the middle or end of September to the middle of November; the largest number of deaths having occurred in October. I put the percentages in a tabular form.

Percentages of Deaths from Scarlet Fever.

Years.	Spring.	Summer.	Autumn.	Winter.
1840-56	18·0	23·6	35·2	23·2
1840-49	17·7	24·8	35·6	21·9
1850-56	18·5	22·2	34·3	25·0

The variation in the rate of death in the quarters of the two periods under examination was much less than in either measles or small-pox. In the spring quarters of 1840-49, the rate was 17·7, and of 1850-56, 18·5 per cent.; in the summers of 1840-49 it was 24·8, and of 1850-56, 22·2 per cent.; in the autumns of 1840-49 it was 35·6, and of 1850-56, 34·3 per cent.; in the winters of 1840-49 it was 21·9 per cent., and of 1850-56, 25·0 per cent. From these data it is evident that the greatest mortality from scarlet fever occurs in autumn, and the smallest in spring. The variation in the rate of mortality was greatest in the winter quarters; for in the winters of 1840-49, out of each 100 deaths, 21·9 per cent. occurred, whilst in 1850-56 no less than 25·0 per cent. happened. A comparison with the temperature shows that this increased rate of death was coincident with a series of unusually warm winters, which is in accordance with the results deduced in my former papers.

The rate of death in the two periods was by no means alike, 1858 deaths having been registered in each year of 1840-49, and 2124 in each of the years 1850-56, being an excess of one-seventh. This has arisen from the disease having assumed an epidemic form at shorter intervals than usual.

FEVER. The rate of death from fever is far more uniform than from any other disease under consideration, and is far less affected by seasonal changes, for it ranged during the period 1840-56, between 23·4 per cent. in the spring quarters, when it was lowest, and 27·6 in the autumnal quarters when it was highest.

In the years 1840-49, 19,620 deaths from fever were registered, or at the rate of 1,962 per annum, and in the years 1850-57, 16,657 deaths occurred, or in the ratio of 2,379 deaths in each year; so that this disease has proved far more fatal since 1850 than in the previous ten years. How far this depends on greater fatality of the disease, or on the greater frequency of its occurrence, I cannot state; but this, and many other problems will, it is hoped, be solved by the weekly return of sickness now prepared and published from the statistics obtained by the medical officers of health.

The highest mortality in ten corresponding weeks of the years 1840-49 was 469, and the lowest 313, presenting a difference of 156, or an increase on the minimum mortality of one half. The increase on the minimum mortality of small-pox was rather more than double; of measles twice and a half; and of scarlet-fever about twice and four-fifths. The largest number of deaths in ten corresponding weeks of the years 1840-49 took place in the thirty-eighth and fiftieth weeks, and in seven corresponding weeks of the years 1850-56, in the fortieth and forty-third weeks. In 1840-49, the period of highest mortality extended from the thirty-sixth to the fifty-second week; and in 1850-56, from the thirty-sixth to the fifty-first week; corresponding more accurately than in the other eruptive fevers. The smallest number of deaths in ten corresponding weeks of 1840-49, was 313; and in seven corresponding weeks of 1850-56, was 264; having occurred in the former period during the fourteenth week, and in the latter during the ninth week. There was no lengthened period of depression in either of these periods.

The following is the rate of death in the different quarters of the period 1840-56; in the spring quarters 23·4 per cent., in the summer quarters 23·7 per cent., in the autumnal quarters 27·5 per cent, and in the winter quarters 25·3 per cent. These averages vary in a very small degree from those obtained by a consideration of the divided periods 1840-49 and 1850-56; for in the spring quarters of 1840-49 the rate was 23·4 against 23·5 per cent. in 1850-56; in the summer quarters it was, for 1840-49, 23·5 against 23·8 per cent. in

1850-56; in the autumns of 1840-49, 27·5 against 27·7 in 1850-56; and in the winters of 1840-49, 25·6 against 25·0 in 1850-56. These results are strikingly shown in the following table:—

Percentages of Deaths from Fever.

Years.	Spring.	Summer.	Autumn.	Winter.
1840-56	23·4	23·7	27·7	25·3
1840-49	23·4	23·5	27·5	25·6
1850-56	23·5	23·8	27·7	25·6

The numbers of the mortality from fever show that these causes inducing the fatality, if not the outbreak of the disease, act with moderate uniformity at the different seasons of the year, and also in each year; still they show that season does not exercise a marked influence, as the aggregate deaths in the autumns of 1850-56 were 10,016 against 8,490 in the springs of the same years. An examination of the mortality for each week of 1850-56, shows the correctness of these statements. In 1850 the lowest mortality, 25, was registered in the seventeenth week of the year, and the highest, 56, in the forty-sixth; in 1851 the lowest, 18, occurred in the twenty-first week, and the highest, 79, in the forty-third; in 1852, the lowest, 23, in the twenty-fifth week, and 62 in the forty-third week; in 1853, the lowest was 30 in the twenty-fifth week, and 64 in the fiftieth week; in 1854, the lowest, 31, occurred in the ninth week, and the highest, 62, in the forty-fourth week; in 1855 the lowest occurred in the seventeenth week, and the highest, 65, in the fifty-first week; and in 1856, the lowest, 32, was registered in the twentieth week, and the highest, 76, in the forty-fifth week. The mortality from the disease was unusual throughout the whole of the year 1856, and the fluctuations were very great.

Diarrhœa. Although a consideration of the mortality from diarrhœa does not constitute part of our subject, yet it is so closely allied to it, that I think an analysis of its seasonal variations will not prove unacceptable, especially as the numbers of deaths has so very considerably increased during the last ten years.

It appears that no fewer than 29,308 deaths have been registered as caused by diarrhœa during the period now under consideration, of which only 13,264 were registered in the ten years 1840-49, against 16,044 in the seven years 1850-56, or 100 deaths in 1850-56 against each 58 in 1840-49. The highest number of deaths were registered in the thirty-second week of the period 1840-49, and in the thirty-third in the period 1850-56; in the former the number was 812,

in the latter 1,234: the lowest mortuary rate occurred in the fourteenth week of the period 1840-9, and in the eighteenth of 1850-56.

The period of epidemic diarrhœa in 1840-49, was limited to the fourteen weeks from the twenty-eighth to the forty-first, and in 1850-56 to the fifteen weeks from the twenty-eighth to the forty-second. The period of highest mortality was extended from the thirtieth to the thirty-seventh weeks in 1840-49, and the thirty-first to the thirty-seventh weeks in 1850-56. During an equal period, seven weeks (thirty-first to the thirty-seventh inclusive) in 1840-56, no fewer than 12,766 deaths were registered, or more than two-fifths of the aggregate mortality; of these 5,463 happened in 1840-49, and 7,303 in 1850-56. Allowing, then, for a few days delay in registering the deaths, we may say that diarrhœa is ordinarily epidemic from the beginning of July to the first week in October, and that it reaches its maximum during the last weeks in July, the whole of August, and the first ten or fourteen days in September. The mean temperature of these weeks is as follows:—In an average of thirty-eight years—in the thirty-first week, 62·2°; thirty-second week, 62·0°; thirty-third week, 61·4°; thirty-fourth week, 60·5°; thirty-fifth week, 59·6°; thirty-sixth week, 58·5°; thirty-seventh week, 57·4°. The temperature of the thirtieth week was 61·9°; of the twenty-ninth, 62·0°; of the twenty-eighth, 61·9°; and of the twenty-seventh week, 61·9°. It is therefore evident that a mean weekly temperature of 60·5° or above, is coincident with an increase in the mortality from diarrhœa, whilst a fall below that temperature induces a reduction in the mortality.

From these statements we may infer that summer and autumn are the quarters in which the chief mortality from diarrhœa occurs; and an examination of the period 1840-56 shows this, for no less than 81·6 per cent. of the total number of deaths occurred during these quarters. The percentages of the mortality from diarrhœa are singularly uniform during each season, and show the intimate relation existing between a high temperature and a high mortality. There is no doubt that diarrhœa does prevail in very cold weather to a considerable extent; but the mortality from it at that season is much less. In the whole period, 1840-56, 8·5 per cent. of the total mortality happened in spring, 41·9 per cent. in summer, 39·7 in autumn, and 9·9 in winter; or, in 1840-49, 8·0 per cent. in spring, 42·8 per cent. in summer. 40·2 in autumn, and 9·2 in winter; and in 1850-56, 8·7 per

cent. in spring, 41·3 in summer, 39·4 in autumn, and 10·6 in winter. These results may be contrasted best in a tabular form.

Percentages of Deaths from Diarrhœa.

Years.	Spring.	Summer.	Autumn.	Winter.
1840-56	8·5	41·9	39·7	9·9
1840-49	8·0	42·8	40·2	9·2
1850-56	8·7	41·3	39·4	10·6

The correspondence between the rate of deaths in spring and winter is, I must confess, far more close than I expected previously to making this investigation.

As the results may be better comprehended by being eliminated from the body of the paper, I present them in as few words as possible.

1. *Small-pox* presents two periods of depressed and two of elevated mortality; the first period of elevation occurring in January, and the second at the end of May and early in June, the former being the highest; the first period of depression being at the end of March or early in April, and the second in September, the latter being the lowest; and, therefore, small-pox is most fatal in winter, and next in summer, and least fatal in spring.

2. A series of cold springs is attended with comparatively a large mortality; and the period of highest mortality coincided during these years with a temperature of less than 40° Fahr., and the lowest of above 46° Fahr.

3. The average highest mortality, in seventeen corresponding weeks of 1840-56, was more than double the average lowest mortality.

4. *Measles* has only one period of highest, and one of lowest mortality, the former occurring in December, and the latter varying in different years; but the rate of death in spring is much smaller than in any other quarter.

5. The rate of death was greater in the series of spring and winter quarters which were below the average temperature, than in those which were above it.

6. As in small-pox, the average highest mortality from measles during seventeen corresponding weeks in 1840-56 was more than double the average lowest mortality.

7. *Scarlet fever* presents one period of highest and one of lowest rate of death, and this more markedly than either small-pox or measles; the greatest number of deaths occurring at the end of October or beginning of November, the lowest at the middle or end of March or early in April.

8. The average mortality is higher in warm springs than in cold.

9. The mean of the greatest number of deaths from scarlet fever in seventeen corresponding weeks of 1840-56 was about twice and four-fifths as large as the mean of the lowest number of deaths in seventeen corresponding weeks.

10. Although there is a period at which *fever* is more rife than any other—viz., from the thirty-sixth to the fifty-first week—yet there is not any particular short period at which it can be said to reach its culminating point.

11. The greatest rate of death occurs in autumn, and the smallest in spring; the difference between them being less than in any other eruptive fever.

12. The average maximum number of deaths in seventeen corresponding weeks in the years 1840-56 was not much more than one and a half that of the minimum.

13. The period of greatest mortality from *diarrhœa* is very definitely marked, occupying a period of about seven weeks, (from the thirty-first to the thirty-seventh,) during which more than two-fifths of the annual mortality takes place, the greatest rate of death extending from the last week of July to the first week in September.

14. That this period corresponds with a mean weekly temperature of 60° or above.

It must not be inferred from these conclusions that I assume these diseases to be fatal in proportion to the increased rate of death at the different seasons of the year; for we have no statistics as yet to show that the rate of death, as compared with the ratio of attacks, becomes larger at the periods when these diseases are most prevalent. In the case of measles, as death is produced by inflammatory diseases of the respiratory organs, it is more than probable that although the mortality is greater during winter than at any other period of the year, yet the number of attacks may be smaller. These, and many similar statistical inquiries into the natural history of epidemic and other diseases, will most probably be elucidated by a strict investigation of the Weekly Return of Sickness, now published by the Board of Health, from documents supplied by the Medical Officers of Health of this metropolis.

QUARTERLY REPORT OF THE PROCEEDINGS.

Monday, April 6th, 1857; Dr. Babington in the chair. The Annual Report of the Council was read by Dr. McWilliam, and the office bearers for 1857-8 were elected.

The following papers were read:—

1. "On an Outbreak of Fever on Board the Ottoman Ship of the Line *Teshereſieh*;" and

2. "On Scurvy among the Crew of the Ottoman Brig *Fezri Sefet*." By J. N. Radcliffe, Esq., late of the Ottoman Medical Staff.

A discussion followed, in which Dr. Milroy, Dr. McWilliam, Dr. Greenhow, Mr. Kiallmark, Mr. Spencer Wells, and Dr. Babington took part.

Monday, May 3rd. The following papers were read by Dr. McWilliam.

1. "On the Cholera Epidemy, at Fogo, in the Cape de Verd Islands in 1855." By Jose Fernandez da Silva Leaõ, Surgeon of the 1st class in the Portuguese Navy, and Colonial Surgeon of the Cape de Verd Archipelago.

2. "Extract from the Report of Dr. Agosthino Jose Ramos de Carvalho, Chief of the Medical Staff, and President of the Board of Health of the Cape de Verd Islands."

3. "Observations on the Epidemic Cholera, as it appeared at Rio de Janeiro, during 1855-6." By Geo. Lee, M.D., of Rio de Janeiro.

4. "On Cholera at Para in the Brazils, in 1855-6." By Samuel Vines, Esq., H.B.M. Consul at Para.

These papers were discussed by Dr. Waller Lewis, Dr. Milroy, Dr. Snow, Dr. Greenhow, Dr. Camps, Dr. Tripe, and Dr. Babington.

Monday, June 1st. "On the Mortality from Eruptive Fevers at different parts of the year." By J. W. Tripe, M.D. The paper was discussed by Dr. Babington, Dr. Milroy, Dr. Patrick Fraser, Mr. Marson, Dr. Tripe, and Dr. McWilliam.

PRESENTATIONS.

The following donations to the Library of the Society have been made during the quarter:—

1. "Reports on the Sanitary Condition of the Whitechapel District, for the quarters ending December 27th, 1856, and March 30th, 1857. By John Liddle, Esq., Medical Officer of Health for the Whitechapel District." Presented by the Author.

2. "Gazette Médicale d'Orient, publiée par la Societé Imperiale de Médecine de Constantinople." Presented by the Society, through Dr. Babington.

3. "Des Hemorrhagies Pulmonaires, au point de vue de la Physiologie Pathologique, de l'Etiologie, et de la Semeiologie. Par M. J. D. Tholozan, Médecin-Major, Professeur Agregé à l'Ecole Imperiale de Médecine et de Pharmacie Militaires."

4. "Recherches sur les Maladies de l'Armée d'Orient, pendant l'Hiver de 1854 à 1855: lues à l'Académie de Médecine, dans sa séance du 30 Septembre, 1856. Par M. le Docteur Tholozan." Both these works were presented by the Author, through Dr. Waller Lewis.

NEW MEMBERS.

Corresponding.—Wm. R. E. Smart, M.D., Staff Surgeon, R.N. Hospital, Hong Kong.

Resident.—Frederick John Burge, Esq., M.R.C.S., Hammersmith.

TRANSACTIONS

OF THE

EPIDEMIOLOGICAL SOCIETY OF LONDON.

Papers and Communications.

ON THE CHOLERA EPIDEMY AT THE ISLAND OF FOGO, IN THE CAPE DE VERDS, IN 1855.

By JOSÉ FERNANDEZ DA SILVA LEAÕ, Surgeon in the Portuguese Navy, and Colonial Surgeon of the Cape de Verd Archipelago; Corresponding Member of the Epidemiological Society of London.

[*Translated from the Portuguese by* GEO. MILLER, and J. O. MCWILLIAM.]

THE island of Fogo lies between 14·42° and 15·1° North, and 24·8° and 24·32° West of Greenwich; consequently it is twelve leagues from north to south, and fourteen from east to west; and it is nearly circular. The island has several minor mountains, and in the centre a high ridge (*sierra*), traversing nearly its whole length, approaches the sea towards the north, assuming a semilunar form, the horns of which face eastward. In the centre of this figure there is a mountain of considerable altitude: it is, indeed, a volcanic cone, whose summit is the crater of the volcano, and it can be seen most conspicuously from the east end of the island. Some plains, which the natives call "*ahadas*", are seen here; but generally the declivity is uninterrupted from the base of the mountain ridge to the sea shore, there terminating in abrupt rocky fragments, here and there margined by a narrow strip of a dark coloured sand. The southern part of the island is more level, and the amount of flat is greater here than at any other part. The whole island is intersected by deep ravines, which, run-

ning from the summit of the mountain ridge to the sea, carry off the rains nearly as rapidly as they fall. Nowhere is there any morass to be found. The most abundant springs issue directly from the rocks, generally but little above the level of the sea; they supply excellent water, which being, however, carried away in imperfectly tanned goatskins, rubbed inside with the oil of the Pulga nut, has imparted to it a repugnant smell and disagreeable taste.

The lavas that have, at different periods, been emitted from the volcanoes, particularly those on the north side of the island, have destroyed cultivation; and, as there has been an utter disregard of an old law that no one should fell a tree unless he had previously planted two others, the north side shows scarcely a single tree, not even the wild fig or the tamarind. This want of vegetation probably contributes to the great scarcity of rain on the island of late years. During the periodic rains which prevail from July till November, the winds are from S.E. to S.W. In September and October, there are frequent thunder-storms; from December to June—the dry season—the wind ordinarily blows from N.E., and sometimes from N.W., more particularly in March and April, when the breezes are strong. Sometimes, during the rainy, as well as during the dry season, the wind blows from the eastward for two, three, four, and even five days together, and, by its dryness and rapid evaporating power, it is extremely disagreeable. It is the Harmattan from the African continent, the influence of which extends from 15° North latitude to 1° South. Remittent and intermittent fevers are reported to yield to its influence, and vaccine virus is said to lose its power during the prevalence of this wind.

The heat is excessive during the rainy season, particularly on the sea shore; but, during the dry season, the temperature falls, so as to cause a sensation of cold during the months of December and January.

The population of Fogo in June 1855 was 13,101. It is divided into parishes, of Nostra Senhora da Conceiçao, S. Lorenzo, S. Katharina, and Nostra Senhora da Ajuda, commonly called Monteiros.

The parish of Nostra Senhora da Conceiçao is bounded on the south-east and west by the ocean, and from the north to the west by the parish of San Lorenzo, and to the east by Mount Disimo. The town of San Philip is the largest town on the island, and the only place where there can be said to be any commerce. Here is the best anchorage, and here the principal families, nearly all of whom are of European origin,

reside. The population of San Philip was 258 free males and 297 free females, 332 male and 337 female slaves; these, with 1,257 free men, 1,430 free women, and 49 male slaves, and 43 female slaves, distributed over various parts of the parish, give a total population for Nostra Senhora da Conceiçao of 4,043.

The district of San Lorenzo, the most extensive and populous of the island, is situated about the centre of it, a little westward. It is bounded on the east by the mountain ridge; on the west, by the sea; on the north, by the Ozoria ravine, which separates it from the district of Nostra Senhora da Ajuda. The population consists of 5,195 persons; namely, 2,279 free men, 2,426 free women, 236 male and 255 female slaves. This population is exceedingly scattered

To the east of this great ridge, and on the opposite side of the preceding district, is that of San Katharina, bounded on the north by Nostra Senhora da Ajuda and the ravine of Balea. This district, although nearly as large as that of San Lorenzo, has only 712 inhabitants; viz., 354 free men and 355 free women, 1 male and 2 female slaves. The greater portion of this district is devoted to pasturage. The inhabitants are spread over the whole district. At a place called Casinha, which is on the sea shore to the north of Alcatraz, there are a few ruined houses surrounding a church.

Finally, at the north of the island lies the district Nostra Senhora da Ajuda, with a population of 3,151; namely, 1,446 free men, 1619 free women, and 30 male and 56 female slaves. This population is formed into larger groups than the preceding districts, consisting of small villages near the sea shore; their names are, Sumbango, Feijãosinho, Sitio da Igreja, and Atraz.

The soil of Fogo is capable of growing not only such produce as is usual to its latitude, but many that are European-Indian corn, beans, cassava, and of late years the sweet and the common potato; ground nuts and sugar-cane have of late years been chiefly cultivated. Of the large vineyards and cotton-fields that formerly existed, there is now scarcely a vestige. There are few goats or swine, but there is a large quantity of horned cattle; indeed, in years of abundance, the pasturage is barely sufficient for their support; and, in years of drought, many of them perish of hunger, while others, impelled by want of food, leave their herds, and devour the crops on the cultivated lands: so that, in fact, in those seasons of scarcity, it is not the want of rain alone that does

mischief, but the destruction of the crops by the famishing cattle; and this will continue to be the case until the number of cattle in the island is in proportion to its pasturage.

All the natives of the island are cultivators of the soil; but, with very few exceptions, they know nothing of agriculture, and are so indolent that they content themselves with merely scratching the earth. They work for two or three months in sowing and reaping; the rest of the year is passed in eating, smoking, and sleeping. An industrious man is a "rare bird." They live chiefly on Indian corn, beans, cassava, potatoes, fish, milk, and occasionally goat's flesh. Bread and beef are enjoyed by the upper classes only; and the only houses with an upper story, or any pretensions to comfort, are at San Philip. In the other parts of the island, you find low, damp, ill built, unwhitewashed huts, some of stone, covered with grass, and floored with slabs; and in such as these you will find living men who call themselves "*morgados*" (lords of the manor), and, although living in pigstyes, make pretensions to be thought rich.

The island of Fogo is one of the most salubrious of the Cape de Verd Archipelago, and to its climate many owe the restoration to health of their system, shattered by the country fevers (febres palustres); phthisical patients, the temporary suspension of the march of the disorder. However, notwithstanding so much salubrity, the island is subject, like all others of the Archipelago, to an endemic of a bilious nature, which the natives call "*lavadias*", or the "May sickness", which manifests itself by red urine, tongue furred, yellow, bitter taste, vomiting and dejections bilious, and which ordinarily, after a course of three or four days, terminates in recovery, without the aid of medical treatment. It rarely happens that a case assumes a dangerous form, and much more rarely that death ensues.

But, besides this annual endemic, in the months of October and November, from the sea shore in the parish of San Lorenzo to the heights of San Jose, cases of remittent and intermittent fevers manifest themselves, and their amount and intensity are generally in proportion to the abundance or scarcity of the rains. However, let this locality be affected as it may in this way, the neighbouring district of Nostra Senhora da Conceiçao is very rarely so, except at a place called Correia, where occasionally fever of one or the other form shows itself.

In the year 1854, the rains were scanty in all parts of the island, especially in the Nostra Senhora da Conceiçao district.

The sanitary state of the island was as usual, and there were but few cases of country fever in the months of October and November. The island maintained the same state of salubrity in 1855, until the month of July, having almost imperceptibly passed through the May endemic, and without the appearance of any epizootic or epiphytic disease.

Such was the sanitary state of Fogo when, on the 29th of June, there was seen, to the southward of the island, a barque, that during the following night, with a light hoisted at her masthead, kept tacking between Fogo and Brava. In the morning she was to windward of the port, with her flag flying. There was at the same time in sight the sloop *Benjamin*, which, on the previous day, had sailed from the principal port—the port of the town—for the Salt Port. The barque, now at the northern side of the Rombo Island, got within hail of the sloop, and asked at which of the ports in the islands, that were in sight, provisions and water could be most easily procured. When it was answered that Villa da Praia, in San Jago, was the best, the captain not having charts of the islands, the bearings of that port were given him by the sloop. Following the directions thus obtained, the captain continued to beat to windward, so as to weather the north point of Fogo; but, on one of the tacks, he so neared the land, at the valley of the Cavalliero, that the harbour master of Fogo, who was out in his boat, and had already endeavoured to communicate with the barque, rowed alongside, and, jumping on board, assured the captain that all the necessary supplies were procurable at Fogo. He then piloted the barque into the anchorage.

The barque having dropped anchor at 2 P.M. of June 30th, 1855, the harbour master sent on shore to the deputy of the Board of Health the ship's bill of health, by which it appeared that the Sardinian barque *Corça*, of 273 tons, was commanded by Peter Bozano, with a crew of twenty-two men; that she sailed from Savona on the 31st of May, on a voyage to Monte Video and Lima; and, from an unsealed document in manuscript attached to the bill of health, it further appeared that she had 240 passengers on board, but there was no mention of these in the bill of health. The officer in charge of the sanitary office at the port deemed that the vessel having what is called a clean bill of health was sufficient to justify his admitting her to *pratique*, and he did not visit her. The barque was in due course visited by the customs authorities; and a tidewaiter, called Anselmo Pires, was left on board of her. The captain came at once on shore, and

consigned his ship to John Barboza, merchant; and requested leave from the Board of Health and the collector of customs to land his passengers and their baggage on the following day, intimating at the same time that he had put into the island for fresh provisions and water.

On the 1st of July, one hundred and nineteen passengers were landed from the barque, and lodged in three central houses in the town of St. Philip, and some in the barracks. On this day, and the day following, the contents of many mattresses were thrown overboard from the ship—so many that the inhabitants of the island could see a large space of sea covered with the floating straw, which, in process of time, was washed upon the beach. Besides these, the passengers, as they were landing, emptied many more mattresses; yet each passenger still possessed a mattress. It may be asked how all this came to pass? To whom could the emptied mattresses belong? The captain of the ship, moreover, seeing some of the natives of the island collecting the straw, told them not to make use of it, as it was full of vermin; but on their replying that he was mistaken for it was quite clean, he rejoined that they might do as they pleased, but that they would do well not to use it.

Among the passengers first landed there was a woman with an infant at her breast, that swooned away, and was, to all appearance, dead; and the mother at once returned to the ship with her apparently dying child. Such, indeed, was the sickly look, the lowered condition, and the weakened form of many of the passengers, that they walked about assisted by their fellows. Frequently, men and women were observed to stop and answer the call of nature in the public streets, having no time to seek seclusion for this purpose; and such was the intensity of their thirst, that they went from door to door in the town begging for water. These circumstances and some others attracted the attention of the inhabitants, and caused them to fear visits from such guests.

Many of the inhabitants were, however, so moved with compassion at the sight of so many persons roaming about the streets in distress, that they gave them shelter. Amongst those benevolent minded persons, the daughters of Mr. Alexander Jose d'Abreu were conspicuous; and seeing a poor woman pass their door with two children, so moved were they, that they called them in; and while one of these ladies was in the act of taking the youngest child in her arms, it was attacked with violent vomiting and purging, and fell into a state of utter prostration. The mother at once fled;

and, returning with her husband, both expressed, by gesture, what intense anxiety the ailment of their child caused them. The only surgeon in the place was immediately called to the child, which had vomiting and diarrhœa, and was for some days in a dangerous state, but eventually recovered. It was in Mr. Abreu's house that the child was attended to. His eldest daughter and her slave woman, "Noberta," nursed it, and the latter washed the linen soiled by the child.

All the members of Abreu's family remarked that the character of the evacuations, and of the vomited matter, seemed most to attract the attention of the child's parents. Two other children were also seriously attacked immediately on landing—one of them on the beach, and the other a short time afterwards. Whence could this illness have arisen? It could not certainly be attributed to anything in the island, because one of them was attacked before landing, and the other in a very short time afterwards; and also because every one, old and young, on the island was in the enjoyment of good health.

On the 2nd of July the remainder of the passengers landed, and their appearance denoted that they belonged to a better class of society, and they were also in better health than the others; they shunned communication with those who were landed on the first day. Some of them lodged on shore, while others came on shore during the day, but returned to the ship at night.

The captain authorised his consignee to diet one hundred and sixty-six passengers; and although he allowed beef, mutton, rice, and wine, he rigorously objected to their being served with fish, green vegetables, or fruit, and begged that these should not be shown them, in case they should be tempted to eat them. Now, all who know anything of a long sea voyage, are aware with what avidity vegetables and fruits are sought for and devoured. Yet these people, after thirty days passage, refused them.

The nauseating odour issuing from the houses occupied by the passengers, having been complained of by the neighbouring inhabitants, a visit was paid them by the deputy of the Board of Health; and the result of that visit is thus described by the naval surgeon of the first class, Guilhame Maria Mayer: "It coming to the knowledge of the now deceased delegate of the Board of Health that some of the passengers suffered diarrhœa, and that there was great want of cleanliness in the houses they occupied, he proceeded to inspect them, accompanied by the Clerk of the Council; and not only did he

find want of cleanliness, but also an adult and child affected with diarrhœa; after giving instructions for cleansing, he retired. On the next day another inspection was made, but neither the man nor the child with diarrhœa was there; both of them had been removed to the ship."

On the 4th of July four of the passengers attended at mass; and in the middle of this religious rite one was suddenly attacked with vomiting. The surgeon was immediately sent for. He saw the man, and prescribed for him, when he was conveyed to the ship, but did not return to the shore. On this same day another passenger begged water from Mr. Thedem Monteiro for his son, who had just been attacked with the sickness. Mr. Thedem afterwards asked for this child of its parents; but the reply was, he had been sent on board. In this way children disappeared from day to day.

It is necessary now to inquire what was going on on board the ship while these things were passing on shore. Anzelmo Pires, the customs tide-waiter, who was on board during the whole period of her stay at Fogo, informed me that there were two classes of passengers on board; of the first class—about twenty in number—all lived with the captain in the after part of the ship. The other class, much larger in number, were located in the hold, which was fitted up for passengers. Some among the first class looked sickly; but among the second class many looked very ill, and were suffering much from diarrhœa, for they kept going to the privies on board continually. The greater part of the second class passengers landed on the 1st of the month, and the remainder with those of the first class on the second, except ten first class and fifteen second class, who remained on board. The tide-waiter also said that the crew of the vessel had a separate compartment, and that none of them appeared to have suffered, except the mate; that those who came on board from the shore ill immediately went to the hold; that he frequently saw passengers lying on the decks in agony at night, and that in the morning there was nothing to be seen but their mattresses rolled up. He further corroborated the evidence of the people on shore, with regard to the mattresses being emptied into the sea after the passengers were first landed. He added that the captain caused the hold to be thoroughly whitewashed; and that on the 5th, when the vessel was clean, some of the passengers came on board; and that on the afternoon of the 6th all the passengers precipitately returned on board, and the same night the *Corça* sailed.

From all the circumstances as narrated, it may be concluded, that when the vessel arrived at Fogo, there existed among the passengers an epidemic of a grave character, in which the predominant symptoms were vomiting and diarrhœa, of which some died on board: that the vessel, on her arrival at Fogo, had not the number of passengers (240) which she originally embarked, inasmuch as she landed 166 only, and, adding the 25 that remained on board, 49 remain to be accounted for: that every care was taken to conceal the nature of the disease under which the passengers laboured—the surgeon in the town having been but rarely consulted, although it was notorious that many were ill. The captain, moreover, immediately on anchoring, landed the passengers, and maintained them at his own cost, and at once proceeded to disinfect his ship: the first things he inquired for on shore were lime and vinegar in large quantities.

Based on information derived from the most impartial and competent persons of the town, I have narrated the state of the island before the arrival of the *Corça;* I have told what was the health of the crew of that vessel; and I have detailed the nature of the intercourse between the ship and the shore. Upon the same authority, let me recount what occurred at this time, and afterwards, among the inhabitants of the Port San Philip.

On the 3rd of July, Noberta, the slave of Mr. Abreu, who, as we have seen before, had been nurse and washerwoman to a child from the ship who sickened in Mr. Abreu's house on the first of that month — fell herself sick. Noberta's symptom's were,—vomiting; white coloured evacuations at first, afterwards watery or rice-watery; evacuations at first fetid, and afterwards almost inodorous; insatiable thirst; suppression of urine; dull appearance of the skin, particularly about the eyes, nose, and mouth; rapid wasting of the body; complete alteration of the features; coldness of the skin; profuse cold perspiration; wrinkling of the skin of the hands and feet, as if they had been for some time soaked in water; cramps in the legs, with pains and screaming; excessive depression, but retention of the intellectual faculties; change of the voice to a sound peculiar to the disease; and death. On the following day, Claudio, the slave of Mr. Antonio Medina, who on the preceding evening had visited Noberta, and who lived on terms of intimacy with some of the passengers, and who, moreover, I am assured, had thrown the corpse of one of the passengers into the sea, assisted by Canuto, the slave of Mr. Vasconcellos—was attacked and died

on the 5th, making the second case on the island. Canuto died in two or three days afterwards, after only a few hours suffering. On the 5th and following day, many persons of the lower orders, who had been in more immediate contact with the passengers of the *Corça*, were gravely attacked with the same disorder. On the 6th, it became known throughout the town that a number of people had been seriously attacked, for all seemed to be begging assistance for relations, friends, or slaves that had been taken ill. The whole town seemed to be given up to terror and confusion. What disease could this be? asked many, who, beginning to doubt the correctness of the designation given to it by the surgeon —who had reported that the May sickness, not having shown itself at its proper season, had *now* appeared, but in a graver form. After finding for it various extravagant names, some one who had seen the cholera elsewhere suggested to Mr. De Sousa, the surgeon, that it was that disorder (cholera morbus); but he immediately asked, what similarity was there between this disease and the cholera morbus? In justice to the attainments of my deceased colleague, I must say that I feel convinced that some humane motive led him to disallow the correctness of this diagnosis. As the day advanced, cases of death occurred one after the other. Some, who at daybreak discussed the nature of the incipient epidemy, and gave a helping hand to the sick, were themselves in a few hours attacked; some of them so gravely, that they succumbed to the disease the same day.

Terror struck and uncertain what to do, the inhabitants wandered about, seeing relatives and friends or slaves falling victims to the disease, and expecting that the same lot might be their own; when it occurred to Mr. Vasconcellos to embark in the brigantine *Cordialidade*, and abandon the island. This vessel was consigned to Mr. Vasconcellos, and had arrived on the 4th of July. This determination was very generally acceptable, and the rule became, "Save himself who can". The flight of the principal families was so precipitate, that parents abandoned their offspring, husbands their wives, and wives their husbands. Many indeed reached the *Cordialidade* with scarcely any clothing, and with no thought for provisions.

In contrast to the terror and confusion among the natives, the passengers of the *Corça* continued to walk about the streets of the town, when one of them inquiring at the house of Mr. Monteiro where he could purchase some eggs, he was advised that the best thing he and his companions could do

was to be off, if they did not want to pay dearly for introducing into the island a disease that had already numbered so many victims. Within five minutes the whole of the passengers were in movement, and in two hours they had all re-embarked. The captain went on board without taking on board any fresh provisions or water, for which he at first said he had expressly come in. It was not the want of these things, but the critical sanitary state of his vessel, that caused him to put into the anchorage.

On the 6th of July, the day on which the *Corça* left, there were upwards of thirty new cases, which, being added to those of the preceding day and night, made ninety, of which by eight o'clock in the evening seventeen were fatal, and some of them quite suddenly so. Each moment the epidemy seemed to acquire greater intensity, attacking especially those slaves and tavern keepers who had been in more immediate communication with the people of the *Corça*.

Fatal cases occurring without interruption one after the other, some in a few hours, the cries of relatives and friends, the passing through the streets of the corpses of those who in the morning had risen full of life and vigour, added to the fact of this calamity having taken place in the most healthy part of the island, where nearly all are either related, or, at all events, personally known to each other, led many of those who had protested that they would not abandon the island, to seek refuge that same night on board the brigantine.

The captain of the *Cordialidade*, in accordance with the desire of the multitude that had flocked on board his vessel, got under weigh and proceeded to Brava, at daylight on the morning of the 7th of July, and arrived there at eight o'clock; but the authorities of that island, apprehending from the great number of passengers on board the vessel that some particular disorder had broken out at Fogo, refused her pratique, and the captain, unwilling to undergo quarantine, returned to Fogo, where he anchored at four in the afternoon. Fortunately the sloop *Benjamin* was still at anchor in the Salina when the *Cordialidade* left, and had in the meantime been ordered round to the harbour of San Philip.

The captain of the *Cordialidade* endeavoured in vain to get rid of his passengers, with the exception of four persons who went on shore, and a family that went on board the *Benjamin*. The rest remained on board the *Cordialidade*, in which, on the evening of the same day (7th), they sailed for Villa da Praia, in San Jago, where they arrived on the

9th. The sloop *Benjamin*, with a similar freight of the natives of Fogo, arrived at Villa da Praia on the following day. There were on board these two vessels collectively 38 free men, 65 free women, 20 male and 19 female slaves.

The governor-general having caused a temporary lazaretto to be erected on shore, the people from both vessels performed quarantine there, several cases of cholera occurring while under this detention.

While one portion of the inhabitants of San Philip were crossing the sea to avoid the epidemy, the others, who had not been stricken by the disease, fled to their miserable and confined huts in the interior of the island. All but the indigent, the moribund, and the sick, and some slaves, who, abandoned by their masters, were without food or succour of any kind, had fled. Many of these unhappy slaves were found lying and groaning in their masters' yards, with the pavement for their bed and the dome of heaven for their covering. Others were found that had evidently been dead for days, half-devoured by the famishing dogs and swine. What a horrible death must have been that of those unfortunate beings, who had endured not only the horrors of the disease, but with it the fulness of desolation! Unhappily others, who were not slaves, shared the same fate.

The interments were made by the slaves, but as most of them were attacked by the disease, and some of them suddenly while in the act of carrying corpses, they at length became so terrified that their masters were obliged to use their authority to make them perform their duty, giving them from time to time large quantities of rum. At length things came to such a crisis that corpses remained for days piled up at the entrance of the cemetery, at the church door, and in the houses, until carted away or dragged through the streets to their graves. The interments were at first in the cemetery, which is situated at a little distance from the town; but soon the number of dead so increased, that the bodies were consigned in various other parts of the town, and in the yards behind the houses.

While all this was passing in the town, the people in the country rendered no assistance; whole families were attacked, without a soul to help them, not even to fetch a drop of water from the nearest spring, which is two leagues distant. What could be more horrible than the want of water in a disease where the thirst is so insatiable? In such circumstances, what steps, it may be asked, did the authorities take? The Administrador do Concelho, and the military

commandant, fled; the one on board the *Cordialidade*, and the other on board the *Benjamin*, abandoning the people that had been committed to their charge. It is difficult to ununderstand how those authorities could act so disgracefully, and throw away the opportunity of proving how such offices as theirs could be worthily filled. All honour to the parish priest, who, with the cross of our Saviour folded on his breast, went on his mission of charity by day and by night, administering the holy sacrament to the sick, and, with religious fervour, giving encouragement and consolation from door to door. Nor was the health officer, De Sousa, less worthy of eulogium, who alone, in the midst of this epidemy, with but few resources, consulted not his own safety, but that of others, passing days and nights at the bedside of the sick, doing all that man could do to rescue them from death. It was this noble surgeon who, exhausted, and indeed already morally killed by the epidemy, seeing his patients in torment from thirst, went forth from the town on the 10th to the Morgado Francisco, J. D. S. Monteiro, to beg that he would send water into the town. The benevolent, but aged and bedridden islander, had sufficient force of character to order his slaves to carry water into the town, and distribute it gratuitously among the sick. The surgeon, having succeeded in obtaining a supply of water for the sick in the town, was now called to attend some of those who had fled to the parish of San Lorenzo, and who had sickened there. Having seen many patients, this brave man was returning late at night to Pico Pires, with the intention of being in San Philip early in the following morning; unhappily, his last hour was nigh, for, in the course of a few hours, he himself was attacked, and fell on the 17th of July, like a valiant soldier, at his post. The only official person now left in the town was Mr. Justino Antonio da Silva, Secretary to the Municipal Council, who was indefatigable in his attention to the sick, and in burying the dead. Would to God that all the authorities had comported themselves as did this Justino! The authorities of San Lorenzo could not then have excused themselves from assisting San Philip, on the plea that their own authorities had fled to Villa da Praia.

During the time that the disease was at its height in the town of San Philip, the other parts of the island were in a most healthy condition. I inquired very minutely whether there had been any change in the habits, the food, or the moral condition, of the inhabitants; or any meteorological peculiarity; or any excavations or opening of graves, exposure

of putrefying matters; or, in fact, any changes, personal or material, that could give rise to such an epidemy as that which affected the town of San Philip; but I could detect nothing, excepting the communication with the *Corça*, to account for its appearance there.

In the other parts of the district of Nostra Senhora da Conceiçao, as well as in the district of San Lorenzo, up to the time of the arrival of the fugitives from San Philip, the general health was good; but, in a few days, some of these fugitives began to sicken, and the epidemy then spread among the people of San Lorenzo, attacking those living with or nearest to the people who had come from San Philip. This fact can be vouched for by many now on the island; and it is equally a fact that several families evaded the disease altogether by flying to uninhabited districts, and shutting themselves from all communications from without. Senhor Jeronymo Jose do Sacramento Monteiro, with a portion of his family, and others, escaped in this way. At the same time, it must be admitted there were several persons who experienced no evil result, although they were in immediate contact with many who were severely attacked.

Such was the number of persons from San Philip who fell sick in the other parts of Conceiçao, and in that of San Lorenzo, that, in seven or eight days after the disease had appeared in San Philip, it was spreading over the whole district of Conceiçao, and part of that of Lorenzo. Now, let us see how the disease extended over Conceiçao and San Lorenzo, beginning, in the first place, however, with the district of San Katharina.

Four of the slaves that had been abandoned in the town of San Philip, two belonging to Senhor Joacquim Monteiro de Macedo, both called "Jeronymo"; one called "Beafe", belonging to Senhor Gomes Barboza; and the fourth called "Surna", belonging to Senhor Benjamin Barboza,—became terrified at seeing their companions in the work of interment falling constant victims to the disease; and on the 8th they took a boat, with the intention, they said, of reaching their own country—Bissao. These unfortunate creatures, coasting along the south side of the island, arrived on the 9th close to the point of Alcatraz; but Jeronymo the elder was already suffering from constant vomiting and purging, and his companions, having carried him on shore, sheltered him under a tent made from the boat's sails, and repaired to a place in the neighbourhood, called Casinha, to obtain assistance for their comrade; but, before the people could reach him, he

was dead. Jeronymo the younger, a few hours after arriving at Casinha, was attacked with vomiting, purging, cramps, etc., so severely, that he died on the following day. In three or four days, Manuel de Andrade, an inhabitant of Casinha, who had assisted to nurse the younger Jeromymo, was attacked with the same disease. This man had not been to the town for many days. On the 8th, the slave Manuel dos Reis, belonging to Senhor Marcellino Felix Medina, left San Philip for the San Katharina district. On the 9th, he was found by Sebastian Roderigues at Bomdardiera, lying on the ground, and so ill that Sebastian took him on his back to his house. The slave died, and Sebastian and his family were nearly all attacked by the same disease.

In Cova Matinha, the first person attacked by the disease was Henrique dos Ramos. He was a fugitive from San Philip, and had arrived the day previously. In short, all the information obtained led to the conclusion that the disease was communicated by the fugitives from San Philip to San Katharina, inasmuch as the fugitives were the first sick in San Katharina, and next in succession those who waited upon them, passing from family to family, until it got dominion over the whole district. At the same time, the slaves Surna and Beafe, having lost their two companions from cholera, directed their steps to the district of Nostra Senhora da Ajuda, where they remained during the whole of the epidemy without suffering themselves, although persons who had intercourse with them were attacked by the disease.

Finally, let us see who were the first to be attacked in the district of Nostra Senhora da Ajuda. Mr. José Vasconcellos' slave, Julio, left the town on the 7th of July; on the 8th, he reached Mount Queimado; on the 9th, he was attacked with vomiting, purging, cramps, etc.; and died on the 10th. Three days afterwards, the slave woman Maria, who nursed this Julio, and who for more than a month had not been near the town, sickened and died of cholera.

At Larango, a place near to Ingreja, Sumbango, and Feijãosinho, cases manifested themselves among the fugitive slaves from the town, and from them propagated to the respective inhabitants of those places.

At Ingreja, the first attacked was one Antonio, who had on several occasions been with the sick at Laranjo. He was attacked on the 12th, and died within six hours. Eight days afterwards, Feijãosinho, Sumbango, Laranjo, Ingreja, and Atraz, had many sick, and the disease was soon propagated over the whole island.

Who, on the 30th of June, could have foretold to the people of Fogo that their island, one of the most salubrious of the whole group, would, in a few days, be laid waste by a desolating epidemy; that, by the 12th of the following month, it would be so completely under the deadly dominion of this epidemy that many of its inhabitants, abandoning their nearest and dearest ties, would be seeking safety in San Jago?

On the 15th of July, Senhor Guilhame Maria Meyer, first class surgeon of the navy, arrived in commission on the island; and, in his report to me, I find the following:—

"As soon as I landed, I set about inquiring into the sanitary condition, not only of the town, but of the island generally; and I learnt that nearly all those who remained in the town were affected with purging and vomiting; that, on the previous days, there had been great mortality, amounting to seventeen and eighteen deaths daily; that, on the day preceding my arrival, there had been eight deaths; and, since my arrival, in the morning there had been five deaths; and lastly, that some of those sick were in great danger. The number of sick I visited that same night exceeded 100. In some houses I found as many as five or six sick, nearly all of them extremely poor. To describe the state of misery and abandonment they were in would be difficult; and I shall confine myself to saying that, in addition to cholera, they had to contend with hunger and thirst. Of the sick, some were just attacked, others had been ill a day or two, and a small proportion were convalescent. They had had no medical assistance for two days. My colleague De Sousa was lying dangerously ill at Pico Pires; and, indeed, he died in forty-eight hours after my arrival.

"Having finished my round of visits, I returned to my quarters, where I was occupied until 4 in the morning preparing medicines.

"I next obtained a house for a provisional hospital for all who applied, and by 8 in the morning all was ready. At 9 I began my rounds of visits, and the military commandant gave orders for the removal of patients to the hospital. On the occasion of the second visit, I found the patients in less depressed spirits. Occupation fast accumulated upon me; for, in addition to my patients in the town, I had constant applications from the country for advice and medicines. On the following day I inspected the localities where the dead had been buried, and found that the interments had been so ill conducted that in many places, especially where

the graves had been opened of the churches La Misericordia and the parish church, the bodies were in fact serving as food for the dogs and swine. I caused the clothing of those who had died of the disease to be destroyed, and the houses well aired and fumigated."

In the foregoing report it will be seen what was the state in which the surgeon found the island, and the steps he took prior to my arrival on the 20th of July, when I arrived there in execution of a government decree.

Notwithstanding that what I had heard already from the Fogo fugitives at San Jago led me to believe that the disease that had driven them from Fogo was cholera, and that it had been imported, yet, when I landed at Fogo, I resolved not to be influenced by the opinion to which such information led; and I determined to inquire afresh, and judge for myself, and to arrive at a final conclusion from what I myself saw and heard from disinterested persons, on whom I could place reliance. It was upon this principle of action that I commenced the fulfilment of my mission.

Immediately after my arrival on the island, I visited all the sick in the district of Nostra Senhora da Conceiçao, and on the following day those of the other parishes. In all of them I found a greater or lesser number of sufferers from a disease that showed a perfect similarity of progress. One of the characteristics of an epidemy, says Schmurres, is, that just as a leaf of a tree shows the nature of the tree itself, so an individual case may show exactly the general character of an epidemy. I came to the conclusion that an epidemy raged throughout the island, which, from the march it had taken, and from what I observed, convinced me that, in the district of San Conceiçao, it was in its third stage of progress; in that of San Lorenzo, in its second; and in that of Nostra Senhora da Ajuda, in its first.

Not willing to form a precipitate diagnosis of the epidemy I was observing, notwithstanding that the individual cases presented symptoms so characteristically pathognomonic that it was sufficient to see a couple to determine with certainty what the disease was, especially as I had former experience of cholera, I still attentively watched the cases, and divided them, according to their gravity, in two classes. In the first and second I recognised all the symptoms and the march which the best authors have assigned to cholerine and to Asiatic cholera, from its invasion to the cyanic period, and to that of incomplete reaction; and being the same set of symptoms which came under my notice during the epidemy that

devastated Portugal in 1833. From these facts, I am certain that the disease that reigned at Fogo in 1855 was the Asiatic cholera; and my medical colleagues in the commission are of the same opinion.

Having faithfully narrated the outbreak and spread of cholera over the whole island, I think I have given authentic proof that it was imported into the island by the Sardinian barque *Corça*.

While I was investigating the nature and origin of this epidemy, I at the same time prescribed for the sick, and put in practice various sanitary measures. Practice and theory had demonstrated to me, that the medical man who undertakes to combat an epidemy, has not only to look after those actually sick, but has also to attend to matters connected with public and private hygiene, the omission of such attention frequently rendering the disease more fatal and of more prolonged duration, and, indeed, occasionally giving rise to other diseases. I therefore began by inspecting the residences of those public *employés* who had preceded me in the inquiry, —the Provisional Hospital and the Barracks; and, finding these *employés* all huddled up in one room, that served the double purpose of a drug room and a residence, I ordered that they and the troops, who were improperly quartered, should be suitably accommodated, and within the reach of immediate medical aid. In the hospital I arranged that more space should be given to the sick, and the drug room placed in the same building.

I at the same time issued sanitary regulations, and saw that they were attended to. I caused the graves to be dug to a greater depth, as many of those already used were not sufficiently deep, so that the putrifying corpses emitted the most vile effluvia. I caused the houses to be disinfected and ventilated.

Personally superintending this work, I frequently found in the empty houses vessels containing excrement and vomited fluids of those who had died, and their clothes and bedding just in the state in which they had been left.

After putting these hygienic matters in train, I handed over the charge of the district to Mr. Mayer, and established myself in the centre of San Lorenzo, where the epidemy was then at its height; and I did all in my power to encourage and put spirits into those who were not attacked, to minister to the wants of the sick of that widely extended district, and also enforced upon them the necessity of sanitary precautions.

When the disease was on the decline in San Lorenzo, I

received an intimation from the priest of the Ajuda district, that his parishioners were falling in great numbers under the disease. I therefore proceeded to that district, taking with me the second class naval surgeon, Jose Maria de Mello Dias, who had just arrived in the island, having previously also given into Mr. Mayer's charge the cases remaining in the San Lorenzo and Nosta Senhora de Conceiçao districts.

The account given by the priest of Monteiros was not exaggerated: the cholera morbus raged there. The whole district and its inhabitants were so terror stricken, that those who fell sick immediately begged for the administration to them of the last sacrament, and looked upon death as certain: some, without any ailment at all, exceptiug their own fears, thought themselves so dangerously ill that they made their wills and gave expression to their last requests,—indeed, so completely was this imaginary with some, that when they were told there was nothing the matter with them, they arose from their beds admitting they were well.

Such was the absence of comforts and resources for the indigent class of this district, and, indeed, of the whole island, that the poor creatures had nothing better for sleeping places than small, cold, damp, one-roomed huts, roofed with straw, the walls of which were made of loose stones and generally without plaster, those same sleeping rooms serving also for the kitchen and the place of deposit of all manner of filth. The bed itself would be a dirty mat, the pillow a bundle of dried grass covered with a cloth, the bed-clothes a sheet, and the diet maize broth. Soon after the arrival of myself and my colleague, this condition of things, which must have increased the deadly character of the disease, was in a measure altered—the sick were supplied with poultry, and the indigent with beef at one penny (fifteen reis) per pound, and the starving were fed gratuitously. Those who had not been attacked by the disease gained courage, and those who were suffering from it began to believe that they were not, as a matter of course, to be victims to it. The number of fatal cases so diminished, that out of one hundred and thirty sick at our arrival only seventeen died, whereas prior to this the mortality had been at the rate of fifty per cent. As soon as the number of new cases had diminished considerably, I entrusted the care of this district and that of S. Katharina, where the epidemy had ceased since the 27th of August, to surgeon Dias.

After journeying through the whole of the island, the

better to enable me to arrive at a thorough knowledge of its sanitary condition, I took up my residence in the most central of the districts, where there were still cases occasionally appearing, that I might with the greater facility receive frequent intelligence from my colleagues as to the progress of the disease in their respective districts, and with a view too of being able to give my immediate assistance in case the epidemy broke out in any new quarter.

Upon my arrival in the island, the disease being then in its greatest intensity in the districts of S. Lorenzo, S. Katharina, and Monteiros, I endeavoured to establish hospitals in each of these, that I might have the patients under regular treatment; but I could not, notwithstanding every endeavour, find a house in either of them capable of accommodating even eight or ten sick. If I could have carried out this plan, I am persuaded that the mortality would have been much less, the sick would then have been attended to with greater promptitude and more regularity, their diet would have been different, and when in a state of convalescence they would have been prevented making the dietary mistakes that cost many of them their lives,—such mistakes as eating green beans, maize, and other like substances,—indeed, it was the general belief that these things were not merely innoxious, but that they promoted restoration to health; so that, in reality, the medical man had not only to combat the cholera, but inveterate prejudices too.

Whenever the service required it I visited the different parts of the island, sometimes to assist my colleagues when the disease had broken out or re-appeared, and at other times to inspect the places of interment. In this latter service, my colleague Dias manifested great zeal and activity, not only in covering in the old cemeteries, but in directing and completing the works connected with the new.

The cholera morbus, then, after carrying terror and death into every district of the island, except perhaps the filthiest and generally the least healthy, and certainly the most miserably populated of the whole island—namely, that of the Ribeira do Ilbeo—disappeared. There were no cases in San Katharina after August 27th; in Nostra Senhora da Conceiçao, after September 1st; in San Lorenzo, after September 18th; in Nostra Senhora da Ajuda, after October 4th. Altogether there were 3,508 cases, 643 of which were fatal.

The march of the epidemy, which appeared to me to be always independent of extraneous circumstances, such as more or less heat, the wind, damp, rain, and other atmo-

spheric vicissitudes, was not similar in each district. In San Katharina and Nostra Senhora da Conceiçao, it went through its regular three stages, and terminated for once and all. In Nostra Senhora da Ajuda, it rekindled at the moment when it was thought to be nearly at an end. In San Lorenzo, it reappeared twice; the first and second times, the attacks were graver and more fatal than in the third, when the majority of cases were mild cholerina.

The districts on the sea-shore, and those where the habitations were closer together, forming small villages, were the most severely attacked, and the mortality proportionally greater; and the town of San Philip, the first place attacked, suffered most of all.

The slaves suffered more than any other class, especially those recently imported from Africa; in these the epidemy generally showed itself in the severest form, some of the cases being suddenly fatal. I attribute this in a great measure to absence of all protection from the changes in atmosphere, to a scanty and miserable diet, to the want of anything like care during their sickness, and to the excessive use of ardent spirits, this being obtainable there with facility and in abundance. Indeed, if I may credit what was told me, there was one influential wiseacre who insisted upon it that the country rum *(aqua ardente)* was the best preventive; but, be this as it may, it is a fact that, when I arrived, the heads of families were distributing it abundantly, and even compelling little children to drink it, "et in magnâ quantitate".

The blue stage *(periodo cyanico)* was generally the fatal one; when it was passed, the patient was considered to be safe, unless the reaction took the typhoid *(typhoide)*, the utter prostration of muscular power *(adynamico)*, or the putrid *(ataxico)* character.

I did not meet with any cases where eruptions or glandular swellings of the neck *(parotidas)* supervened. There were many cases of relapse, and they were nearly all fatal. Not taking into account the extremely sudden cases *(casos fulminantes)* which occurred at the first invasion of the disease, and that in some instances had a fatal termination in eight or ten hours, the different stages of the disease then following one upon the other with a marvellous rapidity—not taking these into account, the disease usually ran its course in from three to five days.

I very much desired to make *post mortem* examinations, for I was fully alive to the importance of it; but, unfor-

tunately, neither myself nor my colleagues had the opportunity.

It is pretty generally understood that, in the desire to find a specific, nearly every agent that therapeutics place at our disposal has been tried in combating this disease; but experience shows that no uniform mode of treatment can be successfully followed; and I therefore treated the sick upon the principle of attacking merely the symptoms, using such remedies as the various authorities have most recommended. I observed that, in cases where I used ipecacuanha with saline draughts, in the second stage, with a view to lessen the evacuations, the results were not such as to lead me to prefer this course of treatment to the use of preparations of opium.

The treatment pursued by the islanders themselves, previously to my arrival, was so extraordinary that it deserves mention. In the sudden cases, they administered inward doses of urine mixed with the country rum; and, in the very severe cases, they added to this mixture portions of excrement. Sometimes they used clysters from the decoction of tobacco-leaves, and this without weight or measure! They say that the poor creatures would drink these mixtures, and ask for more; and yet some of them, but not those who were favoured with the tobacco clysters, escaped.

On the 8th of October, the epidemy entirely ceased; and allowing thirty days from thence to elapse, I considered the island free from contagious disease, and my commission consequently ended. I returned to this island, where I arrived on the 17th of November last; and, in bringing to a close this long and but imperfectly drawn report, I have to recommend to your Excellency's notice Guilhame M. Mayer, naval surgeon of the first class; and Jose M. de Mello Dias, naval surgeon of the second class, for the zeal, energy, charitableness, and activity, they displayed during this epidemy. I feel, too, that I should commit a grave fault if I omitted to mention, as worthy of recompense, Mr. Justino Antonio da Silva, high constable for the district of Nostra Senhora da Conceiçao *(ragador da parochia)*, for the important services he rendered.

(Signed) JOSE FERNANDEZ DA SILVA LEAÕ,
Chirurgeon Mor da Provinci.

Villa da Praia, January 15, 1856.

AN HISTORICAL ACCOUNT OF GAOL FEVER.

By FRANCIS C. WEBB, M.D., F.S.A.

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AMONGST the successes which have crowned efforts made in the cause of sanitary reform, few are more worthy of remark than the change which has been effected in the physical condition of prisoners and its consequent effect,—the diminution of fever amongst the population of Great Britain. Up to the commencement of the nineteenth century, fever was not only common in gaols, but it had come to be considered their peculiar product, their indigenous and appropriate growth. As might be supposed, the mischief was not confined to its source, and "gaol distemper," as it was called, was a frequent cause of mortality in our towns and cities. The history of prison fever forms a remarkable page in a retrospect of the physical condition of our countrymen, and its cessation may be considered as one of the noblest triumphs achieved by practical philanthropy. Space will not permit me to review minutely that condition of prisons and their inmates which obtained until the present century was considerably advanced. For information on this subject I can do no more than refer to the writings of Howard, Neild, and Buxton. The appreciable causes which favoured the dissemination of contagious fever in gaols are well known; they were the crowding of human beings in small cells and subterraneous dungeons, the withdrawal of air and water, the want of nourishment and exercise, of clothing and bedding, the filth consequent on the absence of sewerage and necessaries, a sanguinary and ill regulated penal code, and, as the result of all, mental depression which must have amounted, in most instances, to despair.

The following historical notices are offered as a contribution towards a more complete history of the subject. As affording a picture of the past they are of some interest, but they do more than this, they furnish a complete answer to those who question the amount of good accruing to society at large, from enlightened measures for ameliorating the physical condition of its lowest strata.

The earliest historical reference I have found to gaol disease occurs in the year 1414, when, according to Stow, the gaolers in Newgate and Ludgate died, and prisoners in Newgate to the number of sixty-four. Neither in this or in the seven preceding years have I met with any account of

epidemic disease, so that whatever the exact nature of this visitation might be, it had evidently acquired its virulence from the locality and its attending circumstances.

The first outbreak of which I have found mention occurred in the year 1522, at Cambridge. Hall, in his *Chronicle*, tells us, that at the assize kept at the castle of Cambridge, in Lent, the justices and all the gentlemen, bailiffs and others, resorting thither, took such an infection, whether it were of the savour of the prisoners or of the filth of the house, that many gentlemen, as Sir John Cut, Sir Giles Alington, knights, and many other honest yeomen, thereof died, and almost all which were there present were sore sick, and narrowly escaped with their lives. I may observe, that when he speaks of the filth of the house, he refers to the castle in which the prisoners were confined, and which was still used as the county gaol in the time of Howard.

1577 was the year of the celebrated black assizes at Oxford. This was, perhaps, the most fatal outbreak of gaol fever of which we have an account. Five hundred and ten persons are said to have died of it, from the 6th of July to the 10th of August. The historians Camden and Stow make particular mention of this occurrence; but the fullest account of it is given by Thomas Cogan, a graduate in medicine of the University of Oxford, in an Appendix to his *Hauen of Health*, published in the year 1586. It appears from these memorials, that a large concourse of people was assembled at the assize held in the castle of Oxford on the 4th of July, 1577, on the occasion of the trial of one Rowland Jenkes, whom Camden styles a saucy, foul mouthed bookseller, and who had spoken injuriously of the queen. His trial created a considerable sensation at the period, and there were many of the county gentlemen and townspeople present. Suddenly a pestilential disease appeared amongst them. Those present referred it to various causes, some to a poisonous and pestilent vapour, some to the stink of the prisoners, some to the damp of the ground, and some to the poisonous and pestilent breath of the unfortunate Jenkes. However, there cannot be a doubt, from the evidence, that it was a most fatal form of continued fever brought into the court by the prisoners, and this is confirmed by the testimony of Lord Bacon. The jurors died presently, struck down by the poison. They were followed by the two judges, Sir Robert Bell, Lord Chief Baron, Serjeant Baram, Doile, the high sheriff, five of the justices, four councillors at law, and an attorney. Three hundred died in the town of Oxford, and upwards of two

hundred more in the neighbouring country. No women or children are said to have been carried off; and it is remarkable that down to a late period this was held to be a peculiarity in the ravages of the gaol distemper. From the account which Cogan gives of the symptoms, it is evident that it was an adynamic form of fever, accompanied by an altered condition of blood as evidenced by hæmorrhages and petechiæ ("sanguine spots in many parts of the body.") He expressly tells us that depletion by bloodletting and purging was ill borne. When Howard visited Oxford, he was informed by the gaoler that, some years before, wanting to build, he obtained the stones for the purpose from the ruins of the Castle Court. On digging, he found a skeleton with fetters on the legs, probably one of the malefactors who had died in court at the black assize of 1577.

Two years after this occurrence, in the March of 1579, a petition was presented to Queen Elizabeth on the subject of the condition of the prisoners in the Queen's Bench Prison. From the circumstance that double the usual number had been confined there, a disease had broken out which went by the expressive name of "the sickness of the house." During the preceding six years near an hundred persons had died of it, and many were still sick and in danger of their lives. The author of the *Survey of London* tells us "that the disease was engendered chiefly or rather only of the small and few rooms in respect of the many persons abiding in them, and these, by want of air, breathing in one another's faces as they lay, which could not but breed infection, especially when any infectious person was removed from other prisons thither."

In 1585 gaol distemper was rife in Exeter gaol. It broke out at the assizes, and was most fatal to those in court. Out of the twelve persons composing one jury, eleven died of it.

I have been hitherto unable to extract from the records of the seventeenth century any particular instances of disease occurring in prisons. Not that we can suppose it to have been absent, for during the great civil struggle pestilential fever spread its ravages amongst the prisoners of war, the forces in garrison, and the armies in the field. I need only refer to its ravages at Reading in 1643, in the army of the Earl of Essex in the same year, at Newark before it was relieved by Prince Rupert, and at Winchester and Bristol in 1645. But we are unable to separate from these and similar accounts the exact part played by the prison element. One reason of the paucity of detail yielded by this period is to be

found in the frequent epidemics of plague. Sydenham treats of plague and pestilential fever in connection, and there is no doubt that most cases of petechial fever were confounded by ordinary observers with the true pestis. Another reason is furnished by the great political excitement of the time. Historians were so occupied in chronicling the stirring events which were taking place around them, that they probably neglected the less exciting, though not less useful, records of the silent progress of disease. It is not, however, improbable that notices of occurrences bearing on our subject are to be found, although we have hitherto failed in discovering them. The matter is certainly worthy a more extended research.

Never were the prisons of England in a worse condition than during the eighteenth century. War and peace alternated; and each cessation of hostility, flooding the gaols with the refuse of our fleets and armies, was consequently marked by outbursts of gaol distemper. On the other hand, at each gaol delivery the recruiting sergeant, standing at the door of the prison, sought candidates for the soldier's laurel amongst the liberated inmates. We shall hereafter find, on good authority, how constant a source was here of mortality to our sea and land forces. Again, though administered with what in the present age seems unnecessary barbarity, never were the laws worse obeyed than during the reign of the first Georges. On any reference to this period, the mind at once reverts to the scenes painted by Hogarth, and described by Gay and Fielding. But we need not trespass on the provinces of the novelist and dramatist for what is preserved in the sober page of history. I would only refer to the account which Smollet gives of the prevalence of crime in 1730, a year marked by the death of one of England's ablest judges through the infection of gaol fever. His description obtains ample confirmation from the report of the Monthly London Sessions for April in that year, to be found in the *Political State of Great Britain.*

Consequent on the crowding of prisons produced by this state of public morals, gaol fever broke out most severely in the western districts. According to one account, some prisoners, who were brought from Ivelchester gaol to be tried at the Lent assizes at Taunton, infected the court. Lord Chief Baron Pengelley, Sir James Sheppard, serjeant-at-law, and John Pigott, Esq., high sheriff, died, besides many of the inferior class. The writer in the *Political State of Great Britain,* however, appears to state that the outbreak

took place at Exeter. He says, "also Mr. Serjeant Rous, who attended at the assizes at Exeter, and was taken ill there as the others were, but being not so very bad at first, he hastened to London, but died in a few days after he came to his own house." The same authority states, that there were above a hundred prisoners tried, many of them said to be sick of the gaol fever. It is highly probable that the disease was present both at Exeter and Taunton.

The years 1740 and 1741 were marked by famine and epidemics of dysentery and fever in Ireland. The penal institutions may therefore be considered as only participating in the general ills of the country. Still the following facts are illustrative of our subject. On the 10th of March, 1741, a report was made by Dr. Philips to Baron Wainwright upon the state of the prisoners in Limerick gaol. It shows that a great number had died during the previous week of dysentery, and that of the remainder many of them were in a very miserable condition for want of subsistence, others not likely to live, and many very ill with a malignant fever. The judge died of the fever after his return to Dublin from the Munster circuit. The gaol at Tralee was so full that there was not room for the prisoners to lie down; fifty died in six weeks time, and above a hundred were tried, mostly for stealing the means of sustenance.

Dr. Huxham has left us an account of a very fatal petechial fever which devastated the neighbourhood of Launceston in the year 1742. It was of a thoroughly adynamic type, presenting in a most marked degree all the symptoms of typhus. He asserts that it had its origin in the prisons, and was disseminated far and near by the county assizes.

One of the most remarkable notices of an outbreak of gaol fever is given by Sir John Pringle. It occurred in the year following the last rising in the Stuart cause, 1746. About the middle of May in that year, the army under the command of the Duke of Cumberland was encamped at Inverness. They were joined by Brigadier Houghton's regiment, which, with three more, landed at Nairn as a reinforcement. A few days after, twelve men of that corps were sent into the hospital with fever of a low type, which did not admit of depletory treatment. On inquiry, he found that this disease had been contracted in the following manner. A few months before, he says, we had taken a French ship, on board of which were some troops sent to assist the rebels, and in that number some English soldiers, who having formerly deserted to the French in Flanders, as malefactors, were, on their

arrival in England, thrown into gaols; where they were kept till an opportunity offered of sending them by these transports to be tried by a court-martial at Inverness. These prisoners, thirty-six in number, brought with them the gaol distemper, and gave it to the regiment with which they were embarked. In three days after coming ashore, six of the officers were seized with it; and the regiment, in the few days it lay at Nairn, left about eighty sick; and in the ten following that it remained at Inverness, one hundred and twenty, ill of the same fever, were sent into hospital. He elsewhere informs us, that from the hospitals it spread amongst the inhabitants of the town.

The peace of Aix la Chapelle was concluded in October, 1749, and as a consequence a great part of the forces were disbanded. From the difficulty of obtaining employment, and doubtless in many cases from aversion to labour, numbers embraced a life of crime. The result was that the swarming prisons were devastated by the fever. At the Old Bailey Sessions, in May 1750, it broke out: many were infected, and about forty of the upper class and many of the lower, who were present, died. The names of twenty are given in the *Gentleman's Magazine* for that year. Amongst them were Sir Samuel Pennant, the lord mayor, Sir Daniel Lambert, Baron Clark, of the Exchequer, and Mr. Cox, the under sheriff. A hundred prisoners underwent their trial on this occasion. They were kept in the bail dock, and two other small rooms, measuring 14 feet by 11, during the several days occupied by the sessions. It is curious that the contagion principally attacked those who occupied the side of the court to the left of the Lord Mayor; thus the Middlesex jury, who were on the left, lost many, whilst the London jury, on the right, escaped. The Lord Chief Justice and the Recorder, who sat on the right of the Lord Mayor, took no harm, whilst most of the occupiers of the bench on his left suffered. It was inferred that the stream of air from the window directed the *materies morbi* to that part of the court. With two or three exceptions, all who were seized with the fever died. Some who escaped the distemper were attacked with diarrhœa, which, however, yielded easily to treatment. It is not known what proportion of nurses and attendants of the sick suffered. On the representation of Lord Chief Justice Lee, the city authorities took the state of the prisons into consideration. Newgate and some of the other gaols were ordered to be cleansed and provided with ventilators.

With that deliberation, however, which befits the dignity

and usually marks the proceedings of civic functionaries, the ventilation of Newgate was not properly effected for two years afterwards, during which time, in its loathsome cells, six or seven died weekly. In October 1750, Pringle and the Rev. Dr. Hales were consulted as to the best means for procuring purity of air, and preventing infectious disease in Newgate. They advised that a ventilator, worked by a machine in the manner of a windmill, should be erected on the leads. Their advice was accepted, but the plan was not put into execution until July 1752. The erection of this ventilator was marked by decided benefit to the prisoners; the gaol became less offensive and sickly, and although fever was not extinguished, its fatality was much diminished, the deaths falling from six or seven a week to about two a month. In erecting the ventilator eleven workmen were employed in and about Newgate, and of these seven were attacked by the gaol distemper. One of these men conveyed the disorder to six of his family. Sir John Pringle read a most interesting account of these occurrences to the Royal Society in February 1753; his paper appears in the *Philosophical Transactions* for that year. It is curious that more than one of the patients ascribed his attack to the inhalation of the offensive air escaping from the tubes of the old ventilator, which inhalation was immediately followed by nausea, faintness, and violent vomiting.

In 1755, a prisoner from Exeter gaol carried the fever to the town of Axminster. It raged there with considerable violence, and proved fatal to many who were attacked.

In 1761 fever was rife amongst the prisoners of war at Portchester and Winchester. In some of the cases this appears to have presented symptoms not unlike those of the true plague; for buboes in the groins and armpits were observed. It had entirely disappeared at Dr. Lind's inspection in 1762.

In 1772 Warwick county prison was the scene of the ravages of the distemper. It carried off the gaoler and several of the prisoners.

About the same time an outbreak occurred at Bedford. It had been very fatal in the gaol, and the contagion spread to the inhabitants of the town, of whom many died. Mr. Daniel, the surgeon to the gaol, was carried off. His successor changed the treatment from sudorifics to bark and cordials, and a sail ventilator being erected, the fever did not reappear.

Dr. Lettsom, in his *Medical Memoirs*, relates the case of

fourteen persons, who were attacked by the same disease in May 1773: they all resided in a court in Long Lane, Aldersgate Street. The infection was brought into the court by a person who had been confined in Newgate, and had there caught the distemper. Several of these people were females; and Lettsom makes the observation, that he believes them to be the first recorded cases of women being attacked by the gaol fever. In this he was wrong: several cases related by Pringle were also of the fair sex. His forty-eighth and forty-ninth cases are two instances of death in Wood Street Compter, from the same cause. The patients were in both cases debtors, fathers of families, and neither of them owed more than three guineas.

In 1773-74, fever raged in the prison at Aylesbury.

In 1775, Howard found in Dublin Newgate numbers ill with gaol distemper, unattended and disregarded. In 1776, he mentions that he saw cases, and there were several deaths from it, at Hertford. He relates the incident, that a prisoner was brought out as dead from one of the dungeons, but, on being put under the pump, shewed signs of life, and soon after recovered.

In 1781, an extraordinary and very fatal epidemic of fever occurred amongst the Spanish prisoners of war at Winchester. Sir James Carmichael Smith, who has left a full account of this visitation, states that it appeared to have been brought from on board the Spanish ships. It decidedly was not the same disease that was prevalent in English prisons; it differed especially in the absence of petechiæ and marked head symptoms.

In the borough and county gaols, the fever was now apparently rapidly dying out; in 1779, Howard only saw one case, and that in Newgate. In 1782, he did not find a single case in the whole kingdom. This amelioration was no doubt greatly due to his own exertions. But in January 1783, preliminary articles of peace were signed at Versailles between England, France, and Spain. The next month the militia was disbanded, and the forces were otherwise reduced. Again the prisons became crowded, and again the gaol fever appeared. It was at this date that it was so fatal at Worcester. From thence it was carried to Droitwich by a prisoner, who infected his own family and many of the inhabitants. Fourteen died there in a short time.

That the prisons were constant sources of disease to our army and navy during the last century, finds ample confirmation in the writings of Lind and Pringle. The former says,

"the sources of infection to our armies and fleets are undoubtedly the gaols. I have had many patients under my care at Haslar Hospital, particularly deserters from the Marines, who were very ill of the distemper, and brought it immediately from thence." Elsewhere, he tells us that the seeds of this fever were carried by the fleets to all quarters of the world, particularly to North America; and that it occasioned more mortality amongst the seamen, than all other diseases and means of death put together.

The transportation of felons was also a means of disseminating the malady. Our penal settlements, which, until the year 1774, were situated in America, frequently suffered from its introduction.

I would terminate this historical sketch by a few remarks on the nature of the gaol distemper of the eighteenth century. I need, perhaps, scarcely say, that it was typhus fever in its most developed form. It was characterised by the rapid pulse, the loss of strength, the anxiety and depression, the dry black tongue, the critical days, the head symptoms; by the low delirium, with red ferret-like eye, or by coma; by the absence of marked abdominal symptoms until the last stage, when involuntary dark offensive evacuations took place; by the offensive character of the secretion from the skin; and always, in a considerable proportion of cases, by the eruption we now call the mulberry rash, running on into vibices and purple petechiæ; by the tendency to hæmorrhage; and, in many instances, by early dissolution,—the *typhus siderans* of authors. If in some cases the early stages presented what appeared to be an inflammatory condition, a depletion never failed to sink them into the lowest state of exhaustion. It was the same disease as the hospital and ship fever, identical with the pestilential fever of Sydenham. Our retrospect, therefore, throws some light on the etiology of typhus. We know not, perhaps may never know, what the *materies morbi* of typhus may be; but we do know that it invariably appeared in our prisons when human beings were crowded together, living in their own filth, without air, food, and water, and subjected to every depressing influence. Again, from the materials here collected, an argument is fairly deducible against the concentration of fever poison by collecting cases in a circumscribed area. It matters not whether it be within the walls of a gaol, or of a fever hospital or ward; the teaching of recent experience is on this point in accordance with the results of historic investigation.

Lastly, every fact in our review bears its testimony to the

contagious character of typhus. The men who saw it in a form and prevailing to an extent rarely equalled in more modern times, were unanimous in their conclusion; and few can read the unvarnished narratives of Pringle, Lind, Huxham, and Lettsom, without acknowledging its justice.

As the peculiar denizen of our prisons, fever has now disappeared; the gaol distemper no longer holds a place in scientific treatises, or in popular apprehension; and already, probably, few who attend our courts of justice recognise, in the rue thickly strewn in the prisoners' dock, the evidence of the dread which was once inspired by the unfortunate occupants.

QUARTERLY REPORT OF THE PROCEEDINGS.

Monday, July 6th. Dr. Snow in the Chair. "On the History of Gaol Fever in England." By Francis C. Webb, M.D., F.S.A. A discussion followed, in which Dr. Seaton, Mr. Lord, Dr. Camps, Dr. Richardson, Dr. Green, Mr. Hunt, and Dr. McWilliam, took part.

Monday, August 30th. A Paper was read by Dr. McWilliam on "The Local Causes Influencing the Diffusion and Type of Epidemics." By W. I. Cox, M.R.C.S. Dr. Tripe, Dr. Richardson, Dr. Camps, Mr. Burge, Dr. Babington, and Dr. McWilliam, took part in the discussion.

PRESENTATIONS.

Several Books have been presented to the Society during the past quarter: the list is, however, deferred for want of room.

NEW MEMBERS.

Corresponding. Jose Fernandez da Silva Leaõ, Surgeon-Major of the Cape de Verd Archipelago.

NOTICE OF MEETING.

The opening Meeting of the ensuing Session of the Society will be held on Monday, November 2nd, when a Paper will be read by Dr. E. Headlam Greenhow.

TRANSACTIONS

OF THE

EPIDEMIOLOGICAL SOCIETY OF LONDON.

Papers and Communications.

INTRODUCTORY ADDRESS, DELIVERED AT THE OPENING OF THE SESSION 1857-8.

By B. G. BABINGTON, M.D., F.R.S., President of the Society.

In the course of the brief address which I had the honour to deliver from this chair, at the opening meeting of last session, I took occasion to remark that, as peace had happily been restored to Europe, we might reasonably expect that the medical officers of the military services, the Sanitary Commissioners, and the medical men from the ranks of civil life who had been employed in the East, would at no distant time present us with the fruits of their experience in the ample field for observation which the recent campaign had afforded them.

That expectation has already to some extent been realised. The Sanitary Commissioners have published a lengthened and valuable report on the sanitary condition of our army in the Crimea, which has called forth a reply from Sir John Hall, the late head of the medical department of the army in the East. The results of the observation of several other civil as well as military medical officers, on the same field, have likewise appeared; and, at the present moment, at least two important works from the same source are announced as being about to issue from the press. We have, indeed, among the presentations to the library to night, an

interesting monogram on "Cholera at Varna," etc., by Dr. Mackay, late surgeon of H.M. ship *Agamemnon* in the Black Sea.

I may also state, that the excellent paper by Dr. Smart, on the "Climate of the Crimea, and its Effects upon Health, as observed during the first year of the occupation by the Allied Forces;" as well as two communications, "On the Cholera Epidemy at Fogo in the Cape de Verds," by José Fernandez da Silva Leaõ; and "On the History of Gaol Fever in England," by Dr. Webb, have been published among the *Transactions* of the Society in Dr. Richardson's SANITARY REVIEW.

From the medical staff of our allies, also several important works have emanated, bearing upon the diseases, etc., of the French army during the eastern campaign. I may here allude to "A Report on the Sanitary State of the French Army," by M. Michel Lévy; and "Recherches sur les Maladies de l'Armée d'Orient pendant l'Hiver de 1854 à 1855," par M. le Docteur Tholozan.

It is but too painfully known to us that, since the close of the Russian war, and, indeed, only within the last few months, the mutiny of the greater portion of our native troops in India has again drawn heavily upon the military resources of this country. It is not my business here to enter into any detail of the unparalleled atrocities by which this rebellion has acquired, and will ever retain, so hideous a notoriety. I will only observe that our European troops, whether during the long and fatiguing marches to relieve our countrymen and countrywomen in beleaguered forts, or in the no less harassing duties in the Camp before Delhi (now happily in British possession), have had to encounter a far more formidable, and, if possible, a more treacherous foe than the sepoy. Havelock has won ten battles consecutively in the course of a few months—cholera is the only enemy before which he has ever retreated.

Cholera has also for some time been prevalent at Hamburgh, and in several of the Baltic ports; and within the last three weeks some undoubted cases of the same disorder have appeared at Stratford, in Essex; and one, which proved rapidly fatal, occurred about a fortnight back at Poplar, in the eastern district of London.

I am not aware that the disease has at all spread in these districts, or that it has broken out elsewhere in this country; but the proximity of so terrible a scourge is suggestive of the necessity of watching its movements, and taking measures to meet its appearance in an epidemic form.

The attention of our Cholera Committee will, I have no doubt, be forthwith directed to this matter, aware as they are of the great importance, when an outbreak occurs, of ascertaining the origin and history of first cases.

Those of you who have regularly attended the general meetings of the society, are aware that, during the past session, some very important papers have been read; and, according to custom, I now proceed to bring them again under your notice, by stating the titles of these communications.

On Monday, November 3rd, 1856, after a brief introductory address by the president, Dr. Milroy read a paper "On the Mode of Investigating Epidemic Diseases."

On Monday, December 1st, 1856, a paper "On the Climate of the Crimea, and its effects on Health, as observed during the first year of the occupation by the Allies," by William E. Smart, M.D., was read by Dr. McWilliam.

On Monday, March 2nd, 1857, Professor Murphy read the concluding portion of a paper "On Puerperal Fever."

On Monday, April 6th, 1857, a paper "On an Outbreak of Fever on board the Turkish Admiral's Ship at Sinope, and on Scurvy on board a Turkish Brig of War," by J. N. Radcliffe, Esq., late of the Ottoman Contingent, was read by Dr. McWilliam.

On Monday, May 4th, 1857, a paper "On the Cholera Epidemy at Fogo, in the Cape de Verds, in 1855," by Josè Fernandes da Silva Leaõ, was read by Dr. McWilliam; also, "Extract from the Report of Dr. Agostinho Josè Ramos de Carvalho, chief of the Medical Staff of the Cape de Verd Islands; "Observations on Cholera, as it appeared at Rio de Janeiro in 1855-6," by Dr. G. Lee, of that city; and a paper "On Cholera at Para, in the Brazils, in 1855-6," by Samuel Vines, Esq., H. B. M. Consul at Para.

On Monday, July 6th, 1857, a paper "On the History of Gaol Fever in England," by Dr. Webb, was read by the Author.

On Monday, August 3rd, 1857, a paper "On the Local Causes influencing the type and diffusion of Epidemics," by W. I. Cox, Esq., was read by Dr. McWilliam.

The painful duty devolves on me on this occasion to announce to you that Mr. Tucker, the founder of our society and one of our honorary secretaries, has been removed from among us by a mental disease of the most distressing kind. I sincerely believe that his illness was at least much aggravated, if not altogether caused, by his unremitting exertions in our behalf. For this object he, indeed, postponed

attention to his own business, and the consequence was, that when overtaken by the disease with which he is still afflicted, his affairs were in no flourishing condition. You will, I am sure, be gratified to learn that a very considerable amount of subscription has been raised for him among his friends, as well of this society as of the profession generally, and we are not without hope of being able thus to make a permanent, though it may not be an ample provision, for his future support.

Before sitting down, I am desirous to call the attention of the society to the "National Association for the Promotion of Social Science," which, as you are aware, was last month instituted at Birmingham, under the presidency of the veteran Lord Brougham.

The plan by which the association aims at the attainment of its object, is "to bring together, once in every year, the various societies and individuals who are interested in the subject, for the mutual interchange of reliable information, and the discussion of the great social problems of the day."

Public Health formed one of the five departments into which the subjects for consideration at the Birmingham meeting were divided; and a deputation from this Society, consisting of two members of the Council, attended the sittings of that Department, which was presided over by Lord Stanley, a nobleman who has already earned an honourable name in connection with the advancement of human welfare.

These gentlemen, in conformity with a resolution of our Council, were prepared with a report of the objects and proceedings of our Society, to be read before a meeting of the Public Health Department. No pains were spared, on the part of those who undertook to draw it up, to render this report effective; for it was thought right to inform the Association how actively we had for years been engaged in the endeavour to promote the cause of sanitary science and of the public health. So abundant, however, were the materials brought forward for presentation at the meetings of this Department, that no opportunity was afforded the Deputation of accomplishing the wishes of the Council; and the occasion was, therefore, unfortunately lost of enlisting the sympathy and obtaining the cooperation of this extensive and influential Association in the promotion and investigation of Epidemiological Science.

I have, in conclusion, only to express a hope that, as we have hitherto, notwithstanding the untoward events of war and increased taxation as its consequence, steadily pro-

gressed in our work, we may still go on and prosper; and by a supply of good papers and the judicious discussion of them, as well as by the labours of our Committees, keep up our claims, on the score of our usefulness, to the support, intellectual and pecuniary, of the profession and of the public.

ON THE STUDY OF EPIDEMIC DISEASES: ILLUSTRATED BY THE PESTILENCES OF LONDON.

By E. HEADLAM GREENHOW, M.D.

(*Read November 2, 1857.*)

VISITATIONS of epidemic sickness have, perhaps, rarely failed to attract public attention. They have not unfrequently excited public alarm. If, on the one hand, they have often called forth the active practice of some of the noblest virtues of the human character—brotherly love, self-denial, charity and courage, they have, alas! too often, on the other hand, been the means of temporarily slackening the bonds of social life, and of letting loose some of the worst and most depraved passions of human nature. The history of epidemic diseases forms one of the most interesting subjects of medical inquiry. The investigation of the causes which produce, and of the laws that govern, epidemic visitations, is one of the most important subjects to which the attention of the physician can be directed. Whilst other diseases are frequently attributable to accident, to personal habits, or to individual constitution, epidemic diseases are evidently produced by causes of a more extensive kind, which act on mankind in the aggregate. However influenced in their course or their result by the condition of individuals, the liability to their invasion is shared at once by large sections of the community; and if they are to be averted, this can only be effected by measures that are co-extensive with this tendency.

The study of epidemic diseases has engaged the attention of many of the ablest members of the medical profession from the days of Hippocrates down to our own time. The treatises on epidemics of the physician of Cos contain matter well worthy of careful consideration by ourselves. The most practical physicians have, indeed, ever been the most successful and the most philosophical inquirers into the causes and relations of epidemics. But that I shall hereafter have occasion to refer to his writings, it would scarcely be needful to remind you of the admirable treatises on the epidemics of

the seventeenth century, by our own distinguished Sydenham; or of the works of his equally eminent contemporaries, Willis and Morton, who also flourished towards the close of that great epidemic period. The writings of these bright lights of the medical profession abound with important facts and observations of undying interest, because their knowledge was the result of practical experience and personal observation carefully noted and honestly recorded. However much science may advance or theory may change, such information never becomes obsolete, and the writings in which it is contained can never be carefully studied without benefit. More recently we have had many contributions to epidemiological science. Among these is the learned and graphic historical sketch of middle-age epidemics by Hecker, for the English version of which our medical literature is so deeply indebted to the learned President of this Society. The existence of this Society, devoted exclusively to the study and elucidation of epidemic diseases, attests that the interest which has heretofore attached to them is by no means on the wane. Epidemiological science has, notwithstanding, made but slow progress. In some respects, we have, perhaps, fallen somewhat behind our predecessors. In but few have we advanced materially beyond them in our knowledge of epidemic diseases, or in the philosophical investigation of their history. This has no doubt arisen in part from the long and happy immunity from pestilences enjoyed by our country after the close of the seventeenth century. It has, however, been also perhaps partly caused by the comprehensive character of the study, so opposed to the specialising system of the day. For the division of labour, which forms so important a feature of modern civilisation, seems to have been imported into medical science. Whether it be the manufacture of a needle, a scientific investigation, or the practice of medicine, the same tendency to the extreme subdivision of labour is now manifested. Each man has his speciality, to which he devotes his chief, too often his exclusive attention.

This adoption by medical men of the mechanical system of subdivided labour has in nothing proved more detrimental to the interests of science than in the study of epidemics, for the correct understanding of which a wide and enlarged grasp of the subject is indispensable. The collection of detailed facts and minute observations is, indeed, as essential a step to a just estimate of epidemic diseases as of any other subject of investigation. But observation must extend to a wider field, both as regards time, space and subject, than has

been very usual, if it be designed to aid in the elucidation of a class of diseases whose history and course are so mysterious; which appear so capricious alike in the time, places and persons they attack; which so often visit us, to use the quaint language of an old writer, like "a blast from the stars," and having run their course, again leave us, without apparent reason, for an indefinite period.

It is but an imperfect knowledge of any epidemic disease that can be acquired from its study, however careful, in a single visitation, or even in a succession of visitations, in the same place. Perhaps it might even be justly affirmed that the study of a single form of epidemic disease, however extensive, or however careful, would leave many points obscure which might be rendered clear by its comparison with other diseases of the same class. Although epidemic diseases commonly seem to commence suddenly and mostly run their course in a particular place, within a comparatively short period, it is important to trace them from their origin, and to follow them to their close;—to observe their antecedents, and to note whether the public health at once returns to its pristine condition after their decline. Hence it is not sufficient to study the history, or the accompanying phenomena, of epidemic visitations. The prevailing types of disease, and the condition of the public health, both anterior and subsequent to such visitations, if carefully studied, will often throw important light upon their history and causes. Neither, in studying diseases which so obviously depend upon, or at least are largely influenced by, causes that act simultaneously upon great numbers of persons, must the attention be confined exclusively to the disease itself. Many cosmical phenomena, the state of the weather, peculiarities of season, and other evident circumstances, will deserve notice. Hence, also, it will be both interesting and useful to inquire into the influence, if any, which these several circumstances have produced upon the lower forms of organised beings, and particularly upon domestic animals and cultivated plants. Thus the careful and extended study of epidemic diseases involves the investigation of many and various circumstances anterior, concurrent, and subsequent to the visitation, whose history and causes it is desired to elucidate.

The form and character of epidemic diseases have varied greatly from period to period. The black death, the sweating sickness, and the glandular plague, which prevailed among our ancestors, have long since disappeared. He would be indeed a rash man who should dare to assert that these

diseases are practically unknown amongst ourselves in the present day, because they have not been imported by human means from abroad. If the comparatively scanty commerce, and the limited international intercourse of the fourteenth and seventeenth centuries, were sufficient to introduce such fatal diseases as the black death and the plague—the first of which still prevails in certain parts of Hindostan under the name of the *Pali* plague; whilst the other is often prevalent either in Turkey, Egypt, or the adjoining countries—surely these diseases must have found their way hither by means of the more intimate intercourse of nations in the nineteenth century, notwithstanding the utmost vigilance of the quarantine department. As will presently appear, these diseases, whether they be of indigenous or of foreign origin, require a predisposition of persons or of places for their development. The *crasis* of the people, the conditions amidst which they exist, and the variations in these, coincident with changes of time, circumstance and civilisation, therefore demand the attention of the physician who has set himself the task of investigating epidemic diseases. Besides the study of these positive phenomena, important knowledge may likewise be derived from the investigation of certain negative facts. The singular immunity enjoyed at periods of almost universal epidemic visitation by the inhabitants of particular districts, by certain races, or by particular classes of persons, well deserve consideration. The Jews have often been believed to escape diseases from which the nations among whom they live as strangers have suffered severely. Although the assertion is certainly not true in respect of cholera, it is probably not without foundation in the case of some other pestilences. The sweating sickness is alleged by Cains to have confined itself almost exclusively to the upper and wealthier classes of society, and so exclusively in some of its visitations to the English race, that no aliens were attacked by it in England, and none but the English suffered from it abroad.

If the view of the subject I have here ventured to express be correct—and I express it with great deference and humility in the presence of a society devoted to the investigation of epidemic diseases—how wide the field of labour upon which the Epidemiological Society of London has entered! how plentiful the harvest it may hope to reap! When the Council of this Society did me the honour of inviting me to prepare a paper for the inauguration of the session, whose commencement dates from to-day, I thought I might, perhaps without

impropriety, employ a portion of the brief time at my disposal in thus attempting to sum up shortly the most obvious heads of inquiry in the study of epidemic diseases. I have done so with much diffidence in such a presence, and rather in the expectation of furnishing a topic for profitable discussion, which may serve to elicit the opinions of my auditors, than from any hope of conveying to them any new ideas. I now propose briefly to illustrate the preceding suggestions by a reference to the epidemics of London.

By the epidemics of London I mean only the more notable diseases of this kind, and such as, if they be capable of spreading by infection, are likewise admitted by almost universal consent to spread sometimes irrespectively of personal intercourse with the infected; or to require some peculiar condition of persons or places for their full development. Thus purely contagious affections, such as small-pox and scarlatina, which, however much they may vary in *intensity* with variations of time and circumstance, vary in *amount* only in proportion to the number of persons unprotected by a previous attack or by personal idiosyncrasy, who are brought into relation with the special contagion, will not fall within the class as thus defined. The epidemics, therefore, whose history I propose to employ for my present purpose, and which might very appropriately be termed pure epidemics, will be conveniently divisible into two classes, viz.:

1. Epidemics apparently depending upon some purely atmospherical influence, which will comprise only the single form of febrile disorder, known under the name of influenza.

2. Epidemic pestilences, depending also, indeed, in a great measure, upon atmospherical influences for their production, but requiring likewise some definite condition of persons or places, peculiar to each, for their full development. Under this head, the black death, sweating sickness, plague, dysentery, or, as I propose to term it, alvine flux, and cholera (also a form of alvine flux) will be included.

The most prominent feature in the history of all these diseases is their irregularly periodical character, their tendency to recur again and again, in the epidemic form, after absences of longer or shorter duration. Such has been the history of all of them, excepting the black death, of which only one visit is recorded. Sweating sickness, plague, and cholera, have each returned several times.

Their successive appearance is next worthy of note. The black death was the distinctive pestilence of the fourteenth century. The sweating sickness occupied the last portion of

the fifteenth and the first half of the sixteenth centuries. Although not exclusively, for both plague and other epidemics preceded or followed it, and occupied the intervals between the successive outbreaks, it was the distinctive pestilence of the period. It, too, passed away as the black death had previously done, and was succeeded by plague, which prevailed in an epidemic form on several occasions between the middle of the sixteenth and the end of the third quarter of the seventeenth century. As the plague period drew to a close, a pestilential form of alvine flux arose. Mixed up with the plague in 1665, this new form of epidemic committed ravages which, if small in comparison with the mortality of the great plague year, were yet such as would in our day excite the gravest alarm. This form of disease prevailed, more or less, to the close of the seventeenth century, and, although in a form less malignant and scarcely epidemic, continued during the early portion of the eighteenth century. The eighteenth century, with this exception, presents a remarkable contrast both with the preceding centuries and our own. It was free from pestilence, although not free from epidemics. There were at least ten visitations of influenza during the century, besides a much greater prevalence of fever than now. The fever death-rate, which was nearly 54 in each 10,000 persons living at the middle of the eighteenth century, has been below 39 in the middle of the present century. The general death-rate, which is now but 25, then exceeded 35 in the 1000. The number of births in London, which now very considerably exceed the deaths, were then, with very rare exceptions, exceeded by the deaths. It is, indeed, true that the records in the last and early portion of the present centuries were records not of births, but of baptisms in parish churches; but then, on the other hand, the mortuary returns were returns not of all who died, but of that portion only which were buried in parochial burial grounds. The register of baptism was then an important document that might be essential on many occasions during life. The number of the unbaptised was therefore probably more than counterbalanced by the number of persons interred in extra-parochial cemeteries. I have dwelt somewhat upon this immunity of London from pestilence during the eighteenth century, because it has always seemed to myself a fact worthy of the most careful consideration. Notwithstanding the great improvement that has taken place in the state of the public health since the middle of the eighteenth century, notwithstanding the advances that have been made during the last

half century in art, science and civilisation, epidemic pestilence has re-appeared in London within the last thirty years, and on three several occasions carried off some thousands of its population within a few weeks. This pestilence, which I need scarcely mention as cholera, is of that class to which I have applied the term alvine flux; a term that seems convenient, because it comprises both the milder and the more severe forms of the epidemic.

Pestilence, on its re-appearance after the immunity of more than a century, has therefore returned to us in the same character in which it took leave of our ancestors a century and a half since, at the close of a long series of successive pestilences. It has done more—it has returned in the same form. The disease we now call cholera, and whose threatened return for a fourth time is even now occupying a share of the public attention, is identical with one of the forms of alvine flux that prevailed at the former period. Then, as at present, it was intermixed with dysentery, and probably in a larger proportion than now, because the diet and habits of the period were conducive to that form of disease. It was also confounded in name with dysentery, although its distinctive characters were duly appreciated and clearly recorded by Willis. This fact is so interesting and important, not only as a matter of history, but also from its bearing upon the origin of cholera, that I may, perhaps, be permitted to devote a brief space to its elucidation.

Willis speaks of a form of alvine flux as peculiar to London. "It hath used to reign," he says, "almost every year," and "is commonly accounted popular, and almost proper, to the place and people." "Although the word dysentery, in the common acceptation thereof, signifies a bloody flux of the belly . . . yet, saving the etymology, I shall apply that name to this *London* disease, even when it is not at all bloody. For I have often, and a great while since, observed, that there are two very different sorts of the same flux, which almost every year is wont to be so rife here about autumn, and is commonly called, in our language, *the griping of the guts*; in the one, whereof the stools were watery, and, as it were, limpid or clear, with a sudden weakening of the body; in the other, they are bloody, but tolerable." He then proceeds to give an account of them both as they were observed, and then exactly described, by him some years before, when they were rife.

"In the year 1670, about the autumnal equinox, a great many were sick of an unbloody, but a very sharp and dan-

gerous dysentery. The distemper came upon them on a sudden, and oftentimes without any manifest cause, and reduced the patients by grievous vomiting, frequent stools, and those watery ones, in a short time to very great weakness, horrid faintings of their spirits, and destruction of their strength. I knew a great many that, though the day before they were well enough and very hearty, yet, within twelve hours, were so miserably cast down by the tyranny of this disease, that they seemed ready to expire, in that their pulse was weak and slender, a cold sweat came upon them, and their breath was short and gasping; and, indeed, many of them that wanted either fit remedies or the help of physicians, died quickly of it. This distemper raged for a whole month, but began to decrease about the middle of October and before the first of November was almost quite gone. Few at that time had bloody stools, and not many cholerick ones, but a great many had both vomitings and evacuations that were waterish, almost limpid, and in a great quantity. And whilst this common dysentery raged so severely within this city, there was scarce any one sick of it in the country, or at least above three miles off. Moreover, though very many were sick in this place, the disease did not seem to be infectious, but only to affect those that were predisposed to receive it."

After a consideration of the treatment and the causes of this London disease,—for he again affirms that it was peculiar to London, and attributes it partly, at least, to the thick smoky atmosphere of the metropolis—Willis proceeds to describe the bloody flux in terms which identify it with the dysentery of the present day. He distinguishes between the sudden onset and rapid course of the *dysenteria incruenta*, just described, and the slower progress of true dysentery, in which the patients' strength continued still so firm, that after they had been sick about a week, and gone to stool almost twenty times every day, they could rise out of their beds. "Though the bloody evacuations seemed terrible, yet the patients did not die suddenly, but continued several weeks, yea sometimes months, voiding blood every day in great quantity."* Morton also, in his *Pyretologia*,†

* Willis's Pharmaceutice Rationalis; translated by S. Pordage, part I, pp. 51-6. London: fol., 1684. I have preferred to quote this unexceptionable translation, to giving what might seem to be my own interpretation to the original.

† Pyretologia seu Exercitationes de Morbis Universalibus Acutis. Londini: 1692, p. 420-1.

draws a distinction between the two forms of flux that prevailed extensively in the autumn of several years following the great plague. The one form he calls dysentery, the other colliquative diarrhœa. "Civitas fere universa hoc Morbo correpta videbatur, atque singulis septimanis tercenti, quadrageni, quinquagenti plùs minus fluxu et tormínibus, cæteroquin dysenteriæ excruciantis, *vel* diarrhœæ colliquativæ diris symptomatis confecti."

Morton's description applies more particularly to the autumns of 1666 and 1667. Upwards of 2300 deaths from alvine flux are recorded in the bills of mortality for 1667, which, if raised in proportion to the increase of population that has since occurred, would be equal to from 11,000 to 12,000 deaths at the present time. Most of these deaths were set down in the bills as occasioned by "griping of the guts"; a much smaller number by bloody flux. To obviate errors which might easily occur at a time when the names of fatal diseases were returned by non-medical persons, I have thrown the several allied diseases of the dysenteric and diarrhœal character together, to make the class to which I have, also to avoid misconception, applied the term "alvine flux." The deaths from this class of disorders in 1670—the year referred to by Willis—amounted to upwards of 3900, which, as London now contains more than five times as many inhabitants as it then contained, was a mortality that would be represented by the deaths of nearly 20,000 persons in the present day.

It will, perhaps, be interesting if, previous to the further consideration of these several forms of pestilence, we now pause for a brief space to contrast the mortality occasioned by former pestilential visitations with that produced by the pestilential epidemic of the nineteenth century.

In his life of Edward III, Barnes* estimates the mortality occasioned in London by the visitation of black death as having amounted to 100,000 at least. Incredible as this mortality must appear, the descriptions of the extremely contagious nature of the disease and of its excessively fatal character, given both by Hecker and Barnes, as well as the panic it excited, lend countenance to the assertion. "Parents," says Barnes, "forsook their children, and wives their husbands; nor would physicians here make their visits, for neither were they able to do good to others, and they were

* The History of Edward III. By Joshua Barnes. Cambridge: 1688. Fol. pp. 430-33.

almost certain thereby to destroy themselves." "Thus was death without sorrow, affinity without friendship, wilful penance and dearth without scarcity, and flying without refuge or succour. For many fled from place to place because of the pestilence; some into deserts and places not inhabited, either in hope or despair: but quick-sighted destruction found them out, and nimble-footed misery was ever ready to attend them. Others, having hired boats and other vessels into which they laid up provisions, thought, or at least hoped, to elude the power of the infection; but the destroying angel, like that in the Revelations, had one foot upon the waters as well as on the land; for alas! the very air they breathed being tainted, they drew in death together with life itself."

But very scanty materials exist from which to judge of the mortality occasioned by the sweating sickness. Five visitations occurred in London, of which the first was in 1485, the last in 1551. The fourth appears to have been the most severe, and was long afterwards spoken of as the great mortality. Of the first outbreak it is alleged that scarcely one in a hundred of the sick escaped, and that many thousands were carried off during the five weeks of its continuance. Of the fifth and last visitation, it is recorded that at Shrewsbury, where it first showed itself, it was fatal to 960 persons in a few days. In London it destroyed 800 lives during the first week of the visitation. It rarely remained long in a place, and appears only to have been very violent for a period of a few days. The gross mortality it caused must, therefore, have fallen far short of that produced by plague, an intercurrent outbreak of which in 1499, is reported to have carried off 30,000 persons in London.* It is worthy of note that the fourth epidemic of sweating sickness extended to the continent, where it excited great alarm and occasioned a considerable mortality. Two thousand deaths occurred in Hamburg; eleven hundred of them in three weeks, and the chief part of them in nine days. Eight hundred persons fell victims to the pestilence in Augsburg in six days. In our own times, cholera has thrice become epidemic in this country soon after its appearance in Hamburg. The sweating sickness of the sixteenth century, after apparently originating in England, showed itself first on the continent at Hamburg. Its appearance there, however, was not until a year after its visit to England. For an accurate account of this

* Hecker's Epidemics of the Middle Ages, published by the Sydenham Society, p. 107, etc.

outbreak, as well as for a more detailed history of the two great pestilences of the middle ages, I beg to refer to the very interesting account of Hecker, and especially to Dr. Babington's elegant translation. It will there be seen how little reason there is for supposing the pestilence to have been imported into Hamburg from England.*

The means of estimating the ravages produced upon the population of London by the black death and the sweating sickness have thus been uncertain. Probably the calculations that have been quoted are wanting in accuracy, and can only at best be considered as approximative. Accurate and reliable data exist in the bills of mortality from which to compute the mortality occasioned by each successive outbreak of the plague, the form of pestilence which, in this long series of epidemic diseases, followed next after the sweating sickness, and, indeed, as already said, occurred intercurrently between its visitations. The London bills of mortality were first instituted on account of the plague. The number of deaths produced by the visitations of 1593 and subsequent plague years are therein recorded as accurately as possible, and if error exists, it lies probably rather in the under than in the over-estimate of the deaths. From these bills, and the works of Captain Graunt and Mr. John Bell, clerk to the Company of Parish Clerks, the total number of deaths from plague and from other causes, both for the whole metropolis and the whole of each year, and for each parish and each week of the year may be learned.† Thinking that it would be interesting to contrast the ravages of plague in the seventeenth century with those of cholera in the nineteenth, I have been at some pains to arrange the facts in such a manner as may serve at the same time to convey some idea of the truly formidable character of the plague, and of the immensely improved condition of the public health in the present as compared with the earlier period. I have selected the three visitations of 1625, 1636, and 1665 as the subjects of investigation, because tolerably reliable calculations of the population of London have been made for periods sufficiently near to each of these visitations to enable the death-rates to be calculated with at least approximative accuracy.

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* Loc. cit., pp. 247-53.

† Natural and Political Observations on the Bills of Mortality. By Capt. JOHN GRAUNT, F.R.S. 1676.

London's Remembrancer; or a true Account of every particular week's Christenings and Mortality in all the years of Pestilence within the cognisance of the Bills of Mortality, being xviii years; taken out of the Register of the Company of Parish Clerks of London. By JOHN BELL, Clerk to the said Company. 1665.

In 1631, a time of scarcity and threatened dearth, the Privy Council, in a letter still extant, applied to the Lord Mayor for a return of the number of mouths—men, women, and children—residing within the jurisdiction of the City. In the return—a copy of which is, I believe, still preserved at Guildhall—the population of each ward within and without the walls and in the borough of Southwark is specified. The total number of inhabitants within the city and its liberties, including Southwark, was 130,280. This was exclusive of Westminster, and of the several populous outlying parishes of Shoreditch, Whitechapel, Stepney, Bermondsey, etc., the population of which, if it could now be added to the return, would raise it to a number less disproportionate with the later computations. Captain Graunt estimated the population of London thirty years later, in the year 1661, to have amounted to 384,000, and King estimated it in 1685 at 530,000. The return of 1631 was intended for a return of the exact number residing within the jurisdiction of the Lord Mayor. The approximative correctness of the later computations is supported by the circumstance that the population of the same area, at the census of 1801, was 742,625. Supposing the earlier computation to have been accurate, the population of London only increased 40 per cent. during the 116 years that intervened between the time of Charles II. and that of the third George. Considering the great increase of commerce, the change of circumstances, and the additional inducements that existed to tempt persons to seek a residence in London towards the close of this period, it is probable that King's calculation exceeds, rather than falls below, the population of the metropolis at the period to which it refers.*

The average annual number of deaths returned in the bills of mortality for each of the six healthy years, 1631—1635 inclusive, was 9704. The total mortality returned for the years 1625 and 1636, when plague prevailed, was 54,265 for the former, and 23,359 for the latter year. The plague visitation of the first of these years, therefore, raised the mortality for that year to more than five times the average annual death loss. The visitation of 1636 was much less severe, and the loss of the metropolitan population by death during that year was less than two and a half times as great as the ordinary average of healthy years at that period. Fully to realise these facts, conceive the mortality of the cholera

* KING's Natural and Political Observations. 1696. See, also, MACAULAY's History of England, vol. i, p. 348, to which I am indebted for the information.

visitations of 1849 and 1854 raising the deaths in London from 68,755, the actual number in 1849, and 73,697, the actual number in 1854, to 266,885 for the earlier, and 132,442 for the later outbreak.* In 1625, no fewer than 35,417 fell victims to the pestilence. In 1636, 10,400 deaths were caused by plague.

Like cholera in our days, plague fell with unequal force upon different districts of the metropolis. The plague death-rate per 1000 persons within the city walls was 129 in 1625, and only 17 in 1636. The plague death-rate of the city without the walls, including the borough of Southwark, but excluding the suburban parishes, the population of which is unknown, was 289 in the 1000 in the more severe visitation of 1625, and 100 in the lighter visitation of 1636. The city mortality within the walls fell in the second outbreak to little more than an eighth; without the walls it exceeded a third, of that of the preceding visitation. A very analogous fact has been exhibited under our own observation. The cholera epidemic of 1853—probably in consequence of the vigorous sanitary inspection and improvements effected under the City Commissioners of Sewers—produced a mortality, less in comparison with that of 1849 than happened in most of the other metropolitan districts.

The differences of death-rate between smaller districts were even more remarkable. Portsoken ward lost 289 persons out of each 1000 by plague in the pestilence of 1625, and 128 in that of 1636. In Bishopsgate Without, the plague death-rates of the two periods were 183 and 132; Cripplegate Without, 362 and 135; Aldersgate Without, 170 and 69; Farringdon Without, 244 and 54; Southwark, 293 and 120. The general death-rates of these years were frightfully high. More than half the inhabitants of Bishopsgate and Cripplegate were numbered with the dead in 1625; and even in the city proper one-fifth of the population appears to have been swept away in the same fatal visitation. The general death-rates of 1636 varied from 56 in each 1000 inhabitants of the city proper, to 263 in Portsoken, and 317 in Bishopsgate Without.†

* The average mortality for the seven years 1845, 6, 7, 8, 50, 1, and 2, was 53,377.

† The deaths for each district have been extracted from the Bills of Mortality; the district populations used as divisors in calculating the death-rates are those returned to the Privy Council in 1631, the particulars of which may be found in Capt. Graunt's work, and have been reprinted in the Report of the Census of 1851. It is commonly asserted by contemporary authorities, that any decrease of the population of London occasioned by pestilence, was

The pestilence of 1665 is reported to have carried off 68,596 persons. The total number of deaths returned in the bill of that calamitous year was 97,306. The best contemporary authorities unanimously agree in believing the actual number of the dead to have considerably exceeded the official returns. The plague death-rate of that year, if Captain Graunt's calculation of the population was correct, must have been 178 in the thousand, and the general death-rate from all causes 253. If this be true, one-fourth of the population was carried away in a few months. But so great was the panic, that all who could do so, fled from the plague-stricken city, and the death-rates in the diminished population must have been higher than is indicated by even these formidable numbers. In the nine weeks commencing August 8th and ending October 10th, 60,000 deaths occurred. The heaviest mortality was in the week ending September 19th, or, according to the reformed calendar, September 8th. Upwards of 8,000 persons died in that week, and of these 7,165 are recorded to have succumbed to the epidemic. Three thousand persons died in one night; probably the most fatal night that ever occurred in London

No data exist from which to calculate the district death-rates of that period. Some idea of the mortality may be formed from employing the population of certain districts in 1801 as the divisor. Assuming, then, the population to have been the same in these districts in 1665 as in 1801, the plague of the former year was fatal to 112 out of each 1000 in St. Andrew's, Holborn; to 181 in St. Bride's; to 140 in St. Botolph's, Aldersgate; to 466 in St. Botolph's, Aldersgate Without; to 126 in St. Giles's, Cripplegate; to 231 in St. Sepulchre; and to 120 in the borough of Southwark. It is certain that in several of these districts the population was much greater in 1801 than in 1665. It is just possible that in others it may have diminished. I have, however, endeavoured to select districts in which there has probably been the least amount of variation. The highest metropolitan district cholera death-rate—that of Rotherhithe in 1849—was only 20·5 in the 1000. The cholera death-rate

always rapidly and completely supplied by immigration. If the loss of population caused by the visitation of 1625 had not been entirely supplied when the city census of 1631 was taken, the death-rates here mentioned are excessive, just in proportion as the population of 1631 was less than that of 1625 anterior to the visitation. Even if the death-rates be on this supposition reduced so much as a third, and there is no reason to believe they ought to be so much reduced, the remainders will appear almost incredible when placed in juxtaposition with the death-rates of the present day.

of the Borough in 1849 was under 17 in the 1000. In 1854, although Southwark was one of the most fatal districts, the cholera death-rate was about 13 in the 1000. Contrast these figures with the plague death-rate of 1665, when 120 persons at least died out of each 1000 of the inhabitants of the same district. The city mortality from cholera in 1832 was at the rate of 5 in the 1000. In 1849—excluding the Unions of East and West London—it was 3·8 in the 1000, and in 1854 only 1·2 in the 1000. The plague death-rates of the city—the same city in local position, but how different in appearance and salubrity—in the visitations of 1625 and 1636 were, as I have already said, 129 and 17 in the 1000 respectively.

After sustaining such frightful losses from plague, it is not surprising that the mortality occasioned by alvine flux, the pestilence which succeeded the plague, should appear to have excited so little attention from contemporary writers. I have already contrasted the gross mortality caused by this form of disease, in two years of the seventeenth century, with the gross mortality produced by the two last visitations of cholera. The disease was of annual occurrence for nearly half a century. It sometimes destroyed 4000 persons in a year, and for twenty-five years together upwards of 2000 annually. Let us now compare the ten years, 1681-90, when the mortality from alvine flux had already begun somewhat to decline, and the ten years, 1846-55, which comprise the two last visitations of cholera, and all the years of the nineteenth century in which diarrhœa has been most fatal, for the purpose of contrasting the alvine flux death-rate of the seventeenth and present centuries. The annual average death-rate from this class of diseases, in the ten years of the seventeenth century, was 477 in the 100,000 persons. In the nineteenth century, it has only been 257. In the eighteenth century, which enjoyed the singular immunity from pestilence already referred to, it was most insignificant. In the ten years 1746-55, for which we possess an approximative estimate of the population—the alvine flux death-rate was only 26 in the 100,000.

Influenza is the only epidemic among those to which reference has been made in this paper which has in our days retained the same essential character that it possessed at the time of the sweating sickness, the plague, and the cholera and dysentery of the seventeenth century. The mortality occasioned by it has varied very much in different visitations. In some epidemics the general mortality of the year has been largely increased by it. In others the effect has

been almost inappreciable. The deaths in the week, from February 3rd to 10th, 1733, were raised by influenza to 1588, making it the most fatal week that had occurred during the previous sixty-eight years. If this was raised in proportion to the present population of the metropolis, the deaths of that single week would be represented by 6718. The last severe epidemic of influenza—that of 1847—was fatal to somewhat more than 5000 persons over and above the usual mortality.* The difference of epidemic death-rate between the two periods has been computed by the Registrar-General at 10 in each 1000 of the population; the increase of the ordinary death-rate during the period of the visitation having been 31 in the 1000 in 1733, as compared with 21 in the 1000 in 1847. This is in accordance with the condition of the public health at the two periods, and also with the result of practical observation. Influenza is not often fatal in the healthy, but falls heavily upon persons previously feeble or delicate, and particularly upon such as were subjects of chronic or of latent pulmonary disease. Thus it is most fatal to the ill-fed, ill-clad, shivering population of the poorer districts where the tubercular *dyscrasia* prevails; more fatal in the insalubrious parts of cities, not because it there meets with any peculiar condition favourable to its development, but with an enfeebled population unable to resist its onslaught.

I must now endeavour briefly to illustrate the suggestions as to the best mode of studying epidemic diseases, enunciated at the commencement of this paper, by the more prominent points in the history of the several pestilences that have just been passed in review. Of these, each has been preceded or accompanied by certain cosmical phenomena. Three out of the five visitations of sweating sickness were preceded by unusually wet seasons. No mention is made of extraordinary humidity in connection with the fourth visitation. The summer and autumn of 1551 are said to have been hot and moist, and the weather of the whole year of an unusual character. Plague was on several occasions coincident with seasonal peculiarities. Mr. Bell, clerk to the company of Parish Clerks of London, speaks, in his account of the plague, of the unseasonableness of 1665 as one cause of the year's calamity. "And I conceive," says he, "that the contagion of the air doth arise from the unseasonableness of the weather; for the weather hath been very seldom, since the

* Tenth Annual Report of the Registrar-General, pp. xxvii-xxx. The 5,000 deaths were spread over a period of six weeks.

beginning of the plague, suitable to the season of the year, but the air hath been close and obnumbulated, insomuch that the sun hath not had power to do its office, which is to exhale all fogs and malign vapours." The influence of seasons on the several forms of alvine flux scarcely needs to be referred to. The hot summer of 1846 was characterised by an amount of mortality from diarrhœa and analogous disease unprecedented since the epidemic period of the eighteenth century. The late unusually hot season has presented the same phenomenon. Each of the three visitations of cholera has been attended by dryness of weather, cloudiness of sky, haziness of atmosphere, and an unusual height of the barometer. The atmosphere has been either still, or its movement below the average, and the temperature in the later visitations high.

There is one feature that has been presented by cholera which has also been noticed in regard to former pestilences. It is one also about which there can be little mistake, whereas, even if data of the kind existed, any attempt to compare the temperature or the weight and electrical condition of the atmosphere during the prevalence of the remoter pestilences, with the same phenomena in cholera years, would fail from the want of accurate means of observation in former periods. The feature to which I refer is the frequent prevalence of mist during periods of epidemic visitation. The last invasion of sweating sickness was inaugurated by impenetrable fogs of bad odour arising from the banks of the Severn. "These poisonous clouds of mist were observed moving from place to place, with the disease in their train," so that "whithersoever the winds wafted the stinking mist, the inhabitants became infected with the sweating sickness."* John Bell's observation on the fogs and malign vapours, which accompanied the last great outbreak of plague in London, has already been quoted. A non-professional, but highly competent observer in the north of England, directed attention to the existence of a sort of cloud, to which he gave the name of cholera cloud, during the visitations both of 1831-2 and 1848-9. The sky was overcast by a sort of misty screen during the calamitous visitation of cholera to Newcastle and Gateshead in 1853. Mr. Glaisher also, in his report to the General Board of Health, speaks of "the three epidemics of cholera as having been attended by a particular state of atmosphere, characterised by a prevalent mist,

* Hecker's Epidemics of the Middle Ages, pp. 291-2.

thin in high places, dense in low." Visitations of influenza have likewise been often accompanied by a prevalence of mist. The epidemics both of 1837 and 1847 were accompanied by an unusual haziness of the atmosphere in the north of England. The influenza visitation of 1847 was, in the metropolis, preceded by mist and gloominess. There was a remarkable darkness on Tuesday, November 16th. On the evening of Saturday, November 20th, "a dense fog lay over the Thames and London for the space of five hours." "On Sunday the sky was overcast."*

Probably the unusual fecundity, or at least the appearance of unusual swarms, of the lower animals, and the prolific production of microscopic fungi, which have so often accompanied epidemic pestilences, are at once the consequence and a proof of some unusual meteorological phenomena. Remarkable flights of locusts have frequently occurred in years of pestilence. Great numbers of flies are recorded to have appeared in 1664, the year in which the last great plague had its beginning. An insect, popularly known as the cholera fly, swarmed in the air both in the years of the earlier epidemics and at the time of the outbreak in Newcastle-on-Tyne in 1853. The occasional prevalence of murrain at the time of human pestilences, is also probably due to the lower animals being acted upon injuriously by the same general causes which so fatally affect the human race.

The apparently sudden outbreak of epidemic diseases is one of their commonest attributes in popular estimation, and has always been employed as an argument in favour of their importation. This suddenness is, however, only apparent; for, with few exceptions, epidemic outbreaks have been preceded by sufficient indications of the existence of an epidemic constitution tending towards, and more or less gradually passing into, the form of the approaching disease. The plague of 1665 was preceded, according to Sydenham, by a severe and unusual form of epidemic fever, into which it again subsided at its termination. It is indeed remarkable how the mortality from fever, and especially spotted fever, increased and waned along with plague. Just as in our own times, an unusual prevalence of diarrhœal flux has often preceded cholera, so was the cholera, so accurately described by Willis, preceded by diarrhœa.

The deaths recorded from diseases of the alvine flux character began to increase slightly several years anterior to the outbreak of cholera in 1831-32. The decline of analo-

* Registrar-General's Tenth Annual Report, p. xxvii.

gous diseases had been very gradual after the epidemic period of the seventeenth century. The annual number of deaths recorded in the bills of mortality, as caused by this form of disease, fell gradually from 1070 at the beginning, to but 20 at the close of the eighteenth century. The average number of deaths remained about 20 until 1823, in which year 48 deaths are recorded from this class of diseases. They again fell until 1827, when the number was 40, and in the four subsequent years 53, 41, 53 and 92. These numbers must not, indeed, be received as conveying an absolutely accurate impression of the mortality caused by alvine flux in these years. The bills of mortality were becoming more and more imperfect from year to year. They were probably relatively correct, and afford, if a faint, yet a true indication of some gradual change either in the *crasis* of the population, or in the circumstances by which it was encompassed, which, if it did not eventually produce, yet gave a predisposition for the approaching pestilence. It is worthy of note, that 48 of the deaths in 1831 were returned under the name of *cholera morbus*. Cholera in the pestilential form did not appear in any part of the metropolis until February 1832. Surely this fact, considered in conjunction with the numerous cases recorded in other parts of the country, many of which, if they were not identical with epidemic cholera, very closely resembled it, is a satisfactory proof that the magazine was ready prepared here, even if the spark which exploded it was brought from abroad.

Even influenza, which is the most sudden of epidemics, often appearing to attack almost a whole population in a few days, is sometimes preceded by diseases which gradually merge into the epidemic. Competent observers spoke of having observed cases of the same character some weeks prior to the great outbreak of January 1837; and Dr. Peacock, in his interesting account of the influenza of 1847, mentions the prevalence of pulmonary affections, attended by an uncommon amount of febrile disturbance, as having preceded the regular epidemic.

As neither plague nor cholera have sprung all at once into full activity, but have usually been preceded by milder diseases of an analogous character, so likewise both these diseases, and probably sweating sickness also, have perhaps been only malignant forms of diseases constantly more or less prevalent in London. It is usually said that plague visited London at intervals in a cyclical manner, the intervening years being presumed to have been healthy. Thus the five great out-

breaks of 1593, 1603, 1625, 1636, and 1665 are frequently referred to. But scarcely a year passed over for nearly a century in which some deaths from plague are not recorded in the bills of mortality. The deaths from plague in the epidemic year 1603, amounted to upwards of 30,000; in 1604, 900 persons died of plague; in 1605, 400; in 1606, 2,000; in 1607, 2,000; in 1608, 2,000; in 1609, 4,000; in 1610, 1,800; from 1640 to 1648, upwards of 1,000 annually. In the years 1646 and 1647, the deaths amounted to 2,436 and 3,597 respectively. Maitland says, in his history of London, that for twenty-five years anterior to the great fire, the city had never been free from plague; and an examination of the bills of mortality shows that between 1603 and 1670, only three years occurred in which no deaths from plague were recorded.

Fever, certain forms of which appear to have held the same relation to plague which diarrhœa holds to cholera, produced, even in healthy seasons, nearly twice as many deaths in proportion to the population of London in the seventeenth century as in the present. The annual mortality from fever of all kinds, for several years anterior to the plague of 1665, exceeded 2,000. In 1661, including 335 cases of "spotted fever and purples," which were considered by contemporary writers as closely akin to the plague, the deaths from fever were 3,825. For eight years after the plague, the total annual mortality from fevers of all kinds never reached 2,000, and the average was under 1,500. In 1678 the deaths from fever, which for several years had, on the average, exceeded 2,000, rose to nearly 2,500; in 1679, to 2,800; in 1680, to 3,500. The mortality did not again retire within the limits of the eight healthy years, 1666-73, during the remainder of the century; but it gradually fell after 1680 until it reached 2,400 in 1683. It now again took a spring, and annually augmented until 1686, when 4,500 deaths were recorded. The deaths from fever henceforward exceeded 3,000 annually until 1694, when 423 deaths are recorded from spotted fever,—a disease already said to have been considered as a form of plague; and, including these, the mortality from fever amounted to 5,459. Fever was prevalent all the year; but it reached its climax in the autumn, and was most fatal in October. If the same rate of mortality were to occur in London for any single year at the present day, the deaths from fever would, in that year, amount to nearly 25,000. These epidemics of fever therefore, although less fatal than plague, bore a resemblance to

it in their history, coming as they did in cycles, and dependant, as they must have been, upon the epidemic constitution of the time. Perhaps they were in their essential nature identical with plague, but some conditions necessary for the full development of the pestilence were absent. It was not unusual, long after the cessation of plague, for fever to be accompanied by phenomena which, in times of pestilential visitation, would have been considered characteristic of plague. Sir John Pringle, and Drs. Freind, Lind, and Munro, all describe fevers in jails, or among the troops, or the seamen of the fleet, which were accompanied by parotid abscesses, buboes, and carbuncles.*

The first cholera epidemic was, as has been above related, preceded by a gradual increase of analogous diseases. These diseases have ever since maintained an important position in the mortality register of London. The mortality they produced gradually increased from 1840 to 1845, when upwards of 2,500 deaths were caused by alvine flux, including diarrhœa, dysentery, and cholera under that head. From that time, the annual number of deaths from this cause, exclusive of years in which cholera has been epidemic, have never fallen so low as 2,000. Just as London was never free from plague during the period when plague was the great pestilence, so has it never been a single year free from cholera since the return of pestilence during the present century in that form of alvine flux. The fever of former days probably bore a typical resemblance, in respect of its relation to the pestilence of the period, with the diarrhœa of the present time. Pursuing, then, this analogy, the scattered cases of fatal cholera that annually happen—which, if slower in their course and upon the whole less malignant in type, are in character identical with epidemic cholera—are the representatives of the similarly scattered cases of plague which occurred in the healthier years of the plague period. During the plague period, there were some years in which the deaths from this pestilence were of insignificant amount. For seven or eight years anterior to 1665, the deaths from plague returned in the bills varied from 6 to 36; those from spotted fever from 114 to 368 in the year. Excluding the years 1848, 9, and 53, in each of which cholera was epidemic, the annual deaths from cholera during the years 1840-53 have varied from 28

* Pringle, Diseases of the Army, London, 1764, pp. 305, 328, 329. See also Observations on the Increase and Decrease of different Diseases, and particularly of the Plague, by William Heberden, jun., M.D., F.R.S., 4to., London, 1801, pp. 91-3.

to 228. In not fewer than six of the ten years they have exceeded 100. In each of the years 1846 and 1851 they exceeded 200. As fatal cases of plague formerly occurred which were not referable to any exotic source, so have there been many partial outbreaks of cholera of late years which have seemed to be of indigenous origin. The recent outbreak in West Ham appears to have been of this character.

Plague and cholera have further agreed in this respect, that the early cases of an epidemic outbreak have usually been the most malignant; the most rapid in their course; the most fatal in their termination. Each has also been considered as an imported disease, although it must be admitted that the views respecting the importation of plague entertained by the physicians of the seventeenth century were much more rational than those often maintained in regard to cholera at the present day. On this point, however, I must guard myself from misapprehension. I do not deny the importation of cholera any more than I deny the contagiousness of plague. The question must still be viewed as an unsettled one, requiring much careful investigation. The cause of pestilential cholera is probably to be found in the product of some particular form of the retrogressive transformation of alvine excretion. This decomposition may possibly take place spontaneously under definite conditions of temperature, moisture, and electricity. It may perhaps take place more readily in cholera excretions than in healthy ones; or the former may serve as a leaven to excite the peculiar putrefaction in the latter. It may be set up by a leaven capable of transmission by human intercourse in some manner as yet unknown. It may perhaps take place either in the moist accumulations of a cesspool or a sewer, or in the water of a river or a pool, provided this be of a certain temperature and sufficiently charged with the necessary organic factor. In the one case, the product of the decomposition will be inhaled in the form of miasm with the air; in the other, it may be drunk dissolved in the water. These points require careful, candid, honest investigation, and they are here referred to lest my previous narration of facts should be construed into an attempt to prove the exclusively indigenous origin of pestilence, and particularly of cholera. I cannot hesitate to believe in its indigenous origin; I dare not, in the present state of our knowledge, as an humble inquirer of nature, deny the possibility of its transmission from abroad. Plague probably was also due to some form of organic decomposition, but the subject of the process was of

a different nature from that which produces cholera. However generated, the poison of plague or of cholera may require a peculiar *crasis* of the human subject; and this *crasis*, depending upon conditions participated in by large numbers of the population, may form a necessary predisposition for the disease. But I profess not to solve questions which can only be set at rest by much patient research and observation.

The chief conclusions that appear to be deducible from the facts here put together are, that of the several forms of epidemic diseases which have at different periods visited London, influenza has maintained its precise character from century to century, because it is independent of the extrinsic conditions of the population it attacks; black death, sweating sickness, plague, and epidemic cholera—whether in the seventeenth or nineteenth centuries—on the other hand, have appeared in succession and then disappeared, because they have required for their development some definite but temporary condition, either of their human subjects or of their places of abode. If a return to the ruder civilisation and habits of the fourteenth century were possible, London might again become liable to black death, which exists even in our own day in some remote provinces of Asia under the name of the *Pali* plague.* A return to the habits and diet of the sixteenth century might reproduce the personal *crasis*, which would lead to the outbreak of malignant rheumatic fever in the form called sweating sickness, which, however, was not altogether uninfluenced by surrounding circumstances. "Noxious exhalations from dung-pits, stagnant waters, swamps, impure canals, and the odour of foul rushes, which were in general use in the dwellings in England, together with all kinds of offensive rubbish, seemed not a little to contribute to it; and it was remarked universally, that wherever such offensive odours prevailed, the sweating sickness appeared more malignant."† The Roettingen sweating sickness of the early part of the present century, which coincided exactly in character with the sweating sickness of the fifteenth and sixteenth centuries, seems to attest the possibility of such an event.‡ A return to the dirty habits and unwholesome customs of our ancestors would almost certainly lead to the recurrence of plague, which still exists in places that in these respects bear some analogy, however faint, to London before

* For this fact I am indebted to a very interesting paper, written for the Epidemiological Society of London, by Dr. Hirsch, of Dantzic, and read at one of the meetings several years since.

† HECKER's Epidemics of the Middle Ages, p. 292. ‡ *Ibid.*, p. 325.

the great fire of 1666. The condition of London at that period may be learned from the writers of the day. The houses were encumbered with dirt and organic *débris* of the most revolting kind, but slightly screened from view by an occasional sprinkling of fresh rushes. The narrow and tortuous streets, undrained, unpaved, uncleansed, were the usual receptacle for all house and trade refuse, including the bodies of domestic animals, and often the offal of slaughtered cattle. Overhung by the projecting upper stories of houses, their ventilation was impeded by the cross signs then suspended from the premises of all tradesmen, a necessary token of residence in times when the numbering of houses was unknown. Cholera, perhaps caused in the seventeenth century by the want of the careful removal of excrement, has probably returned in our own century in consequence of the rapid growth of towns and the difficulty of removing their excrementitious products.

There remain some points of interest in the history of London pestilences to which I would like to have adverted. I could wish to have dwelt at greater length upon others to which I have referred more briefly than they deserved. Whether you adopt or reject the inferences I have deduced from the facts placed before you, I think we shall all agree in the importance of studying epidemic diseases in the broadest and most comprehensive manner. Excluding influenza, for the reason already assigned, it appears to me impossible to study with care and impartiality the history of the several pestilences which have been under consideration without recognising the necessity of certain home-bred elements for their production. They have in turn appeared, and they have in succession departed from London, not because they have at the one time been accidentally imported in bales of cotton, or by means of the sick, or at the other time effectually excluded by repressive precautions; but because at the one period the organic matter out of which plague or cholera is brewed abounded, and at the other period has been wanting. The exciter may perhaps have sometimes come to us over sea, but it would have failed to light up the epidemic conflagration had it not here met with materials upon which it could react.